

THEORETICAL AND METHODOLOGICAL ISSUES AND CHALLENGES IN  
ANALYSES OF TEEN FERTILITY

A Dissertation

by

EUGENIA CONDE-DUDDING

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2011

Major Subject: Sociology

Theoretical and Methodological Issues and Challenges in Analyses of Teen Fertility

Copyright 2011 Eugenia Conde-Dudding

THEORETICAL AND METHODOLOGICAL ISSUES AND CHALLENGES IN  
ANALYSES OF TEEN FERTILITY

A Dissertation

by

EUGENIA CONDE-DUDDING

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Approved by:

Chair of Committee,	Dudley L. Poston, Jr.
Committee Members,	Jeffrey Ackerman
	Holly Foster
	Dennis M. Gorman
	W. Alexander McIntosh
	Rogelio Saenz
Head of Department,	Jane Sell

December 2011

Major Subject: Sociology

## ABSTRACT

Theoretical and Methodological Issues and Challenges in Analyses of Teen Fertility.

(December 2011)

Eugenia Conde-Dudding, B.A., Clark University; M.Ed., University of Texas at Austin;

M.S.P.H., Texas A&M Health and Science Center

Chair of Advisory Committee: Dr. Dudley L. Poston, Jr.

The United States has the highest teen birth rate of any developed country in the world. In the period 2005-2010, the fertility rate for the United States was 41 births per 1,000 women ages 15-19, compared to 26 births in the United Kingdom, and 4 in Switzerland and The Netherlands. However, the teen birth rates in the United States vary considerably by race and ethnic group. National vital statistics data for 2009 report that the rate for Blacks is more than twice that of non-Hispanic Whites, and the rate for Latinas is almost three times as high. The difference within Latino groups is just as dramatic. The adolescent fertility rate per 1,000 for Cubans is 23.5, while for Puerto Ricans it is 61.67, and for Mexicans the rate is 78.7. Teen pregnancy and childbearing in the Mexican American population are issues of great concern because this ethnic group is the fastest growing population in the United States. The literature on teen childbearing among Latinos, and specifically among Mexican origin teens, tends to attribute the high rates to cultural differences. In this dissertation, I argue that the high rates of teen pregnancy cannot properly be attributed to “cultural” characteristics.

Instead, I develop falsifiable hypotheses that are derived from theoretical frameworks which recognize the relationship between racial inequalities and teen fertility. I first test the social characteristics hypothesis to determine the effect that income and parents' education have on teen fertility. Second, I test if other characteristics such as religiosity, type of religion and views on teen pregnancy have an impact on predicting the odds of having a teen birth. Third, drawing on demographic literature, I ascertain whether educational experiences and aspirations to attend college are critical factors in predicting a teen birth. Last, I test if having a teen birth has the same impact for Mexican origin teens compared to Whites in terms of being able to obtain a college degree.

## ACKNOWLEDGEMENTS

First, I would like to thank my dissertation committee. I am most thankful to my chair, Dudley Poston, for all his help, kindness, and patience. His enthusiasm, support and encouragement were my driving force. I am equally grateful to Dr. Rogelio Saenz for all his help, guidance, and encouragement throughout graduate school. Rogelio, tu me enseñaste que muchas cosas son posibles cuando se tiene visión, pasión y corazón. I am also extremely grateful to Dr. Alex McIntosh for being there for me. I always knew that I could count on him whenever I had a question about any topic; I needed advice or a word of encouragement. I am very thankful to Dr. Holly Foster. Her support, guidance and patience were vital in helping me undertake my dissertation analysis using the Add Health data. I am also very grateful to Jeffrey Ackerman for his help and patience and most of all for allowing me to interrupt him frequently with questions. Last, I am especially indebted to Dr. Dennis Gorman, who encouraged me to pursue this degree. His guidance, support, and mentorship were key in helping me survive and succeed in graduate school.

I also want to extend my gratitude to the ASA Minority Fellowship and the Alpha Kappa Delta (AKD) for supporting me and sponsoring me as a graduate Student.

I would also like to thank my dear friends, Brittany, Evelyn, Juanita and Soila. Thank you for all your love and support. Your friendship is the most precious gift I take from graduate school. Bethany – thank you for your friendship and support. You made our trip to China an experience of a lifetime. Next, I want to thank a special person very

close to my heart, my mother-in-law. Thank you so much for your support, love and understanding.

A mi madre le agradezco que me enseñó a amar los libros y el aprendizaje. Pero mas que nada le agradezco infinitamente que me haya enseñado desde niña a preocuparme por las injusticias y desigualdades sociales. Ella fue mi primera maestra de sociología. A mi padre le agradezco su apoyo y que me haya inspirado y enseñado a luchar arduamente para lograr mis metas. A mi hermano Vale le agradezco profundamente que me haya abierto el camino para emprender mi viaje en otro país y así llegar a este punto en mi vida.

Last, I am most grateful to my husband. Nick, tu eres mi razón de ser y mi “lluvia al corazón.” Tu has sido la fuerza que me ha sostenido, levantado y enmendado continuamente. Este es un logro mutuo, el cual tu dirigiste con el amor, paciencia y apoyo que solamente tu me sabes dar. We did it!!!!

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from grant P01-HD31921 for this analysis.

## TABLE OF CONTENTS

	Page
ABSTRACT .....	iii
ACKNOWLEDGEMENTS .....	v
TABLE OF CONTENTS .....	vii
LIST OF FIGURES.....	ix
LIST OF TABLES .....	x
CHAPTER	
I INTRODUCTION.....	1
II LITERATURE REVIEW.....	10
History of Teen Pregnancy in the United States .....	10
Teen Fertility in Developed Countries .....	19
Teen Fertility in Developing Countries.....	23
Teen Fertility in Mexico.....	26
General Fertility Theories in Demography .....	28
Social Characteristics Hypothesis .....	31
Minority Status Hypothesis.....	32
Sub-cultural Hypothesis .....	33
Teen Fertility Research in the United States .....	35
Latina's Teen Fertility .....	40
Conclusion.....	54
III DATA AND METHODS.....	57
Data .....	57
Method .....	59
Missing Data .....	64
Listwise Deletion.....	66
Pairwise Deletion .....	69
Mean Substitution .....	69
Hot Deck and Cold Deck Imputation.....	70
Proxies.....	71
Multiple Imputation.....	72



CHAPTER		Page
IV	SOCIAL CHARACTERISTICS AND PREGNANCY VIEWS HYPOTHESES .....	76
	Social Characteristics Hypothesis .....	76
	Descriptive Statistics .....	77
	Logistic Regression Results .....	79
	Pregnancy Views Hypothesis .....	85
	Descriptive Statistics .....	86
	Logistic Regression Results .....	87
	Conclusion.....	89
V	EDUCATION AND TEEN FERTILITY .....	91
	Educational Aspirations and Experiences Hypothesis .....	92
	Descriptive Statistics .....	92
	Logistic Regression Results .....	94
	Social Inequalities Hypothesis .....	102
	Logistic Regression Results .....	103
	Conclusion.....	106
VI	CONCLUSION .....	107
	Summary .....	107
	Findings.....	112
	Strengths and Weaknesses of the Analysis .....	115
	Futures Research .....	117
	Policy Implications.....	118
	REFERENCES .....	120
	APPENDIX A .....	140
	APPENDIX B .....	146
	VITA .....	155

## LIST OF FIGURES

	Page
Figure 1 2005-2010 Teen Fertility Rates: How Does the U.S. Compare to Other Countries? .....	140
Figure 2 2009 Teen Birth Rates by Race and Ethnicity in the U.S. ....	141
Figure 3 2008 Teen Birth Rates for Latinas by Ethnic background .....	142
Figure 4 Teen Birth Rates in the United States (1940-2009) .....	143
Figure 5 Teen Birth Rates by Race and Ethnicity in the United States (1993-2008) .....	144
Figure 6 Percent of Teen Births to the Total Number of Births in Mexico (1990-2009) .....	145

## LIST OF TABLES

	Page
Table 1 Social Characteristics Hypothesis Descriptive Statistics .....	146
Table 2 Survey Adjusted Logistic Regression of Teen Birth on Social Characteristics Variables (Odds Ratios) .....	147
Table 3 Pregnancy Views Hypothesis Descriptive Statistics .....	148
Table 4 Survey Adjusted Logistic Regression of Pregnancy Views on..... Social Characteristics Variables (Odds Ratios) .....	149
Table 5 Educational Aspirations and Experiences Hypothesis Descriptive Statistics .....	150
Table 6 Survey Adjusted Logistic Regression of Teen Birth on Educational Aspirations and Experiences, All Adolescent Females (Odds Ratios) ....	151
Table 7 Survey Adjusted Logistic Regression of Teen Birth on Educational Aspirations and Experiences, Adolescents Whose Pregnancy Occurred after Wave I (Odds Ratios).....	152
Table 8 Survey Adjusted Logistic Regression of Teen Birth on Educational Aspirations and Experiences, Mexican Origin Teens (Odds Ratios).....	153
Table 9 Survey Adjusted Logistic Regression of Not Graduating from College on Teen Birth (Odds Ratios).....	154

## CHAPTER I

### INTRODUCTION

The United States has the highest teen birth rate of any developed country in the world. In the period 2005-2010, the adolescent fertility rate for the United States was 41 births per 1000 women in the ages 15-19, compared to 26 births in the United Kingdom and 4 in Switzerland and the Netherlands (United Nations 2010) (see Figure 1). The rate for the United States is equivalent for the same period of time to that for Cuba and to the average rate for all the less developed countries of the world. The teen birth rate in Cuba was 42 per 1000 teens, and 47 for the less developed countries in the world; in contrast, the average rate for the more developed countries of the world was 21 (United Nations 2010). Moreover, the teen birth rates in the United States vary considerably by race and ethnic group. National vital statistics data for 2009 indicate that the rate for Blacks is more than double that of non-Hispanic Whites and the rate for Latinas is almost three times as high (Hamilton, Martin and Ventura 2010) (see Figure 2). The difference within Latino groups is just as dramatic. The rate per 1,000 for Cubans is 23.5, while for Puerto Ricans is 61.67 and for Mexicans is 78.7 (Martin et al. 2010) (see Figure 3). The Center for Disease Control (CDC) lists teen pregnancy and childbearing as one of its top priorities because they “bring substantial social and economic costs through immediate

---

This dissertation follows the style of *Demography*.

and long-term impacts on teen parents and their children” (Center for Disease Control 2011).

The CDC’s webpage on teen pregnancy cites Dr. Saul Hoffman’s report on the public sector costs due to teen childbearing. According to this report teen childbearing costs taxpayers 9.1 billion dollars a year in health care, lost wages due to high school drop outs and lower educational attainment, and even incarceration costs because children of teen parents tend more likely to be detained for criminal behavior (Center for Disease Control 2011; Hoffman 2006). Teen pregnancy is also considered a public health problem because babies born to teen mothers usually have a higher risk of dying, and are more likely to have low birth weight or be preterm (Ventura and Hamilton 2011). Other studies have found teen mothers are less likely to graduate from high school, more likely to have neonatal morbidities, and more likely to have an increased risk of depression during pregnancy (Hodgkinson et al. 2010; Klepinger, Lundberg and Plotnick 1995; Perper et al. 2010).

In response to this problem, President Obama in December of 2009 signed the Teen Pregnancy Prevention Initiative. Under this initiative, 114.5 million dollars were allocated to fund “evidence-based programs” showing promise to reduce teen pregnancy and birth rates in the United States (Krisberg 2010). The goal of these programs is to reduce teen pregnancy through sex education that is “age-appropriate” and “medically appropriate” (Boonstra 2010). This initiative intends to replace the Title V abstinence education programs, which the Bush administration promoted.

President Obama's initiative is driven by the need to reduce the costs and adverse social consequences of teen pregnancy. However, my review of the literature on teen pregnancy (which I cover in the next chapter of this dissertation) has led me to conclude that the United States is facing two distinct challenges with respect to teen pregnancy and adolescent childbearing. First, for economic and social reasons the United States indeed needs to reduce its overall teen birth rate to resemble that of a developed country. But to achieve this goal, the US also has to address a second problem, namely, the disparity in birth rates between the different racial and ethnic groups. I view these challenges as two separate problems because the former rests on the assumption that teen pregnancy is *causing* other social problems, while the second calls for an examination of racial inequalities in the United States. If teen childbearing is treated as the cause of certain economic and social problems, the goal then is one of reducing or eliminating "problem behavior." But if the goal is to address the racial and ethnic differences in adolescent birth rates, one then is forced to examine other complex factors that might be contributing to this problem.

Sociological research on teen childbearing among African Americans reveals that teen motherhood is not the cause of other adverse social problems, such as lower educational attainment and poverty; but rather teen childbearing is a *symptom* of a much larger and complex social problem of racial and social inequality (Furstenberg 2007; Geronimus 1986; Luker 1996). This position will be discussed in greater detail in Chapter II; but briefly, it is a result of research findings that suggest that teens get pregnant because they are already in a bad situation (Furstenberg 2007). Moreover,

African American women who have children after their teenage years are not much better off in terms of educational attainment or income compared to women who were not teen mothers (Furstenberg 2007; Geronimus et al. 1992). In other words, by examining the racial differences in teen childbearing, researchers have found that teen motherhood is not the cause of more social problems; it is a consequence of deeper social inequality issues in the United States.

Subscribing to this perspective in my dissertation I will attempt to examine some of the key factors that contribute to the high rates of teen fertility among Mexican origin teenage females. While teen birthrates of all Latinas in the United States are very high, I will restrict my analysis to a study of only Mexican origin teens because this group has specific characteristics and backgrounds that are not shared by other Latino groups.

Latinos living in the United States are not a homogenous group of people. Their country of origin has had a critical impact in shaping how they live and are treated in the United States. In other words, each Latino group has faced distinctive historical, political, legal and economic challenges in the United States, and these, I argue, have had an impact on the social and economic resources that are available to them. For example, it is extremely difficult for undocumented immigrant youth to attend college; and even if they eventually are able to matriculate and eventually graduate, they will not be allowed to work in the United States due to their immigration status. Latino students who were born and raised in the United States face a great deal of discrimination in the school system; they are more likely to be tracked into classes that will not prepare them to get accepted into college and are more likely to live in school districts that have few

resources to give them a high-quality education (Romo and Falbo 1996; Valenzuela 1999).

In addition, for immigrants the availability of social service resources varies depending on their immigration status and country of origin (Portes and Zhou 1993). Permanent residents holding a green card have to wait five years before they can be eligible to receive Medicaid or other type of federal assistance and, in some cases, state funded social or health care services. On the other hand, refugees and asylum seekers can usually receive most of the social services available to citizens regardless of how long they have lived in the United States. That is, Cuban immigrants are eligible for all federally funded services because they are allowed immediate refugee status once they touch American soil. Puerto Ricans are born American citizens. And, Nicaraguans were given temporary asylum during their civil war, and in 1997 many Nicaraguans were able to request permanent residency in the United States with the passing of the Nicaraguan Adjustment and Central American Relief Act, or NACARA.

On the other hand, Mexican-origin people have surely the longest and most complex background of any Latino group in the United States. While Mexicans are usually perceived as an immigrant group, the states of California, Arizona, New Mexico, Texas, and parts of Nevada, Utah and Colorado were all part of the Mexican territory up to the middle of the 19th century (Massey, Durand and Malone 2002). Starting in the 20th century the U.S. immigration laws toward Mexico have changed depending on particular need in the United States to boost its economy through cheap labor (Massey et al. 2002). Consequently, the history of Mexican origin people in the United States can



be traced for more than one hundred years while the histories of the others are much shorter; indeed most of the other Latinos in the U.S. are recent immigrants. It is estimated that out of the 30 million of Mexican Latinos, only 40 percent are foreign born (Grieco 2007 ). In short, Mexican origin teens have social and political challenges that are unique to them. Consequently, I hold that in order to truly understand why Mexican origin teens have the highest teen birth rate in the country, this group must be studied separately from other Latino groups.

Teen pregnancy and childbearing in the Mexican American population are issues of great concern because, for one reason, Mexican origin Latinos are the fastest growing population in the United States (U.S. Census Bureau 2008). In 1993 Blacks had the highest teen birth rate with 110.5 births per thousand females in the ages 15 to 19. However, between 1994 and 2007, Mexican-origin teens became the group with the highest teen birth rate in the country (Martin et al. 2010).

Despite the high rates of teen pregnancy among Latinas, most of the literature on teen pregnancy in the United States is about African Americans (Furstenberg 2007; Geronimus and Korenman 1993; Geronimus, Korenman and Hillemeier 1994; Harris 1997; Luker 1996). There is but a modicum of research focusing on the fertility of Latino youth, and my review of this literature (to be presented in the next chapter) shows that there are key theoretical and methodological issues that have not been addressed. Therefore, in my dissertation I will highlight these shortcomings in the literature and will make an effort to address two of what I consider to be the most prevailing weakness of the current literature.

In Chapter II I will demonstrate that one of the more pervasive problems in the literature of teen childbearing among Latino and specifically Mexican origin teens is that the high teen birth rates are attributed to cultural differences. I will try to show how these conclusions have been drawn after failing to explain differences in terms of social characteristics. Yet, the concept of culture is used loosely without providing a definition or a theoretical framework that can explain its function or at least explain how a “cultural” response differs from behaviors that are adopted in response to political or economic structures. I will argue that without a theoretical framework for a cultural explanation, we are unable to conduct truly scientific research because there is no underlying theory to help us make predictions and test hypotheses. Moreover, attributing differences to cultural factors places the responsibility on the minority group and absolves us researchers from the responsibility to search for more complex answers that might lie in the society’s social and political structure. Most important, explanations devoid of theory do not allow us to make progress in understanding and addressing the problem of teen fertility among Mexican origin teens.

In response to theoretical and conceptual problems and issues in the literature dealing with adolescent pregnancy and fertility, I will argue in my dissertation, and present results from a quantitative analysis, that the high rates of teen pregnancy cannot properly be attributed to “cultural” characteristics. Instead I will put forward the argument that we need to develop falsifiable hypotheses that are derived from theoretical frameworks and which recognize the relationship between racial inequalities and teen fertility. In attempts to accomplish this goal, I will first test the social characteristics

hypothesis to determine the effect that parents' education and income have on teen fertility. Second, I will test if other characteristics such as religiosity, type of religion and views on teen parenthood have an impact on predicting the odds of having a teen birth. Third, drawing on demographic and medical sociological literatures, I will ascertain whether educational experiences and aspirations to attend college are critical factors to consider when predicting whether or not an adolescent experiences a teen birth. Last, I will test if having a teen birth has the same impact for Mexican origin teens compared to Whites in terms of being able to obtain a college degree.

Another issue I will address is that of missing data. From a methodological perspective, I found that nowhere near enough attention is given to the problem of missing data. Therefore, I will discuss different methods of handling missing data and their implications for drawing conclusions in scientific research. I will show the importance of addressing the issue of missing data in understanding teen pregnancy, and I will carry out all my statistical analyses using the most widely used methods for handling missing data, namely listwise deletion and multiple imputation, the latter being one of the two most highly recommended methods (Acock 2005; Allison 2001; Enders 2006; Treiman 2009).

This dissertation will be divided into six chapters. In the next chapter, the second chapter, I undertake a review of the literature on the topic of teen pregnancy and childbearing. I review the history of teen births in the United States, and the studies and theories that have been developed to understand the higher birth rates of African American and Latina adolescents in the United States. I will highlight the various

weaknesses of the literature and will show how I have tried to overcome these challenges. In Chapter III, I will describe the data and methods I will use to conduct my statistical analyses. Moreover, in this chapter I will also review different methods of handling missing data, explaining their strengths and weaknesses. Chapter IV presents the results of the first statistical analysis, in which I test whether the differences between Mexican origin teen birth rates and whites disappear when adjusting for socioeconomic status. In addition, I examine whether pronatalist views remain for Mexican origin teens after one controls for income. These results will be presented using both listwise deletion and multiple imputation to handle missing data. In Chapter V I test if aspirations to go to college and being held back a grade have an effect on reducing the odds that a woman will have a child in her teenage years. Moreover, I test if having a teen birth has an effect on graduating from college. Again, the results will be presented with both listwise deletion and multiple imputation. The last chapter is the conclusion and discussion of the findings.

## CHAPTER II

### LITERATURE REVIEW

In this chapter I review what I consider to be the most important literature for understanding the teen fertility of Mexican-origin adolescents in the United States. First, I will present a historical background about teen pregnancy. This will be followed by an overview of teen fertility rates in developed and developing countries. Then I undertake a review of the most prominent demographic theories that we currently use to understand fertility in general and that of racial and ethnic minorities. In addition, I will examine relevant literature on the adolescent fertility of African Americans and Latinas in the United States. The objective of this review is to identify the main theoretical and methodological issues and problems in the literature. I will conclude the chapter by proposing my research questions and explaining how these will attempt to address some of the gaps in the literature.

#### **History of Teen Pregnancy in the United States**

The history of teen fertility shows that although teen childbearing is now considered a major social problem, teen births have been declining almost steadily since the 1950's (Ventura, Mathews and Hamilton 2001). In 2009 the United States had the lowest teen birth rate ever recorded (Ventura and Hamilton 2011); nonetheless, as teen birth rates have been decreasing, the stigmatization of teen mothers has been increasing (Arai 2009; Luker 1996). Kristin Luker (1996) explains that Americans have a history of

early childbearing compared to other European countries. She points out that while teen motherhood is now perceived as an epidemic in the United States, the “real” epidemic occurred in the 1950’s, when even the youngest teens were having more babies than in the previous decades. In 1957, the U.S. had the highest teen birth rate ever recorded, with 96.3 births per thousand adolescents (Ventura et al. 2001; Ventura and Hamilton 2011).

Figure 4 shows that teen pregnancies increased shortly after the end of World War II as part of the baby boom. With the exception of a mild increase in the 1990’s, teen fertility rates have been declining for all racial groups since the 1970’s (Ventura and Hamilton 2011; Ventura et al. 2001). Figure 5 shows that from the mid 1990’s, Latinas and teens of Mexican origin have had the highest birth rates compared to Whites and African Americans. Unfortunately, there are no complete data available by ethnicity and for Mexican origin women prior to 1993, because it was not until 1993 that all states included the Hispanic option in the birth certificates (Martin et al. 2010). By 1989 all states but Oklahoma, New Hampshire, and Louisiana had the Hispanic identifier option. In 1993 all states had the Hispanic identity option in the birth certificates (Mathews et al. 1998). Moreover, in the 1980’s a national survey of young women did not include the Hispanic option; the National Survey of Family Growth had an option for Hispanics but did not oversample. The only sources were limited data in the Current Population Survey and the Centers for Disease Control survey of women on the U-S Mexican border and from clinic data (Darabi, Dryfoos and Schwartz 1986).

Therefore, we cannot accurately trace the historical trends of teen births for Latinas in the United States prior to 1993. Figure 5 shows that on average, in the last 20 years, the teen birth rates have decreased for all racial and ethnic groups including Latinas of Mexican descent (Ventura and Hamilton, 2011). The irony of these statistics is that as the numbers have been increasing, the stigma and concern for teen motherhood have increased dramatically (Luker 1996), especially for minority women (Geronimus 2003).

In his book, *Destinies of the disadvantaged: The politics of childbearing*, Frank Furstenberg offers a unique sociological perspective to understand how teen pregnancy became an issue of social concern (Furstenberg 2007). He explains that, historically, premarital sex has been more common than conservatives are willing to admit. However prior to the 1970's teen pregnancies were 'resolved' with adoption or with what is known as gun-shot weddings. But these were mainly the alternatives for White women because they were more likely to marry and of course find homes that would want to adopt a White child. The adoption of an African American child by a White family was unthinkable.

Weddings and adoptions as solutions for Whites to teen pregnancies started to decline in the 1970's. This trend was most likely influenced by changes in gender roles, views about marriage, access to birth control, and the educational and professional opportunities for women (Furstenberg 2007; Luker 1996; Parnell, Swicegood and Stevens 1994). Researchers point out that teen childbearing caught the public's attention, not because the birth rates were high but because the number of children born out of

wedlock was increasing (Furstenberg 2007; Luker 1996). This trend was more prevalent in African American communities, because in the 1960's and 1970's jobs became scarcer for African American men (Furstenberg 2007; Testa et al. 1989; Wilson 1996). During this period there was also a boom of adolescents, children of the baby boomers. Consequently, even though the teen birth rate was declining, teen pregnancy was becoming more stigmatized because there were more teens and fewer of them were getting married if they became pregnant. In 1950 only 13.4 of the teen pregnancies were to unmarried women; by 1960 the percent increased to 14.8 and by 1970, 29.5 percent (Ventura et al. 2001). In 1983 the percentage had increase to 50 percent and by the year 2000 the percentage reached 78.7 percent (Ventura et al. 2001).

Luker (1996) explains that although this trend was occurring among women of all ages and both African American and White women, teen motherhood was first viewed as an African American problem mainly as a result of Daniel Patrick Moynihan's 1965 report, *The Negro Family: The Case For National Action*. In this report Moynihan argued that African Americans were having children too young and that early childbearing was interfering with school completion and was perpetuating poverty. The report therefore made African Americans the target of teen pregnancy even though Whites were following the trend of having children at a young age and not getting married.

The panic of teen pregnancy as an epidemic was also fueled by a number of reports from the Alan Guttmacher Institute (AGI). Furstenberg explains, that the "AGI blended alarming demographic data with dire predictions about the adverse



consequences of early childbearing, drawing on the relative primitive research of the time ... “(2007:15) . Another report that had a tremendous impact on the construction of teen pregnancy as deviant behavior was Arthur Campbell’s piece published in 1968. In this demographic article Campbell argued that poor women having out of wedlock children were putting a toll on public assistance support, namely the Aid For Families with Dependent Children program (AFDC) (Furstenberg 2007). These reports created the perception that teen pregnancy was a deviant behavior. The panic that these reports created made the public overlook the fact that Americans have a history of early pregnancy and that the teen birth rate was actually decreasing in the United States (Furstenberg 2007). But what was most damaging was the fact that teen pregnancy came to be seen as a deviant behavior associated mainly with African Americans (Luker 1996).

Kristin Luker (1996) argues that the current view of teen motherhood as a problem was shaped by other historical events. She reminds us that the concept of adolescence was introduced by G. Stanley Hall in 1904 when he published his book, *Adolescence: Its Psychological and Its Relations to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education*. Prior to the 20 Century the definition of youth was based on financial independence rather than on chronological age; consequently, someone as young as seven or as old as a thirty could be perceived as a child. Moreover, she highlights the point that after the American Revolution the legal age of marriage was 12 years for women and 14 years for men. These definitions changed over time, but as late as 1906 some states in the United States still followed the

12 and 14 law. Currently the legal age for marriage in the US is 18, but some states allow adolescents as young as 15 to marry with parental consent (Cornell University Law School 2011). Luker, (1996) also points out that the age range of teen parenthood is too wide and obscures the fact the two thirds of the teen pregnancies are born to older teens (18-19). For example, in the year 2008 the birth rate for all teens of the ages 15-17 in the United States was 21.7 births per thousand females ages 15-17, compared to 70.6 for adolescents 18-19. For Latinas 15-17, the rate is almost double the national rate with a rate of 46.1 birth per thousand females ages 15-17 compared to 127.2 for the older teens. The rate for African American 15-17 is 34.8 while for the older African American teens the rate is 106. Non-Hispanic Whites have the lowest rates. The rate of younger teens is 11.5 but for older teens it is 48.5 (Martin et al. 2010). The rates for all racial and ethnic groups are indeed higher for the older adolescents, but the rates are still higher for African Americans and Latinas. Moreover, even the lowest rate, which is 11.5 for Non-Hispanic females 15-17, is higher than the total rates in other developed countries (United Nations 2010).

Luker (1996) makes the argument that views about adolescent pregnancy also have their origin in historical views about what is considered to be a “fit” parent. She explains that Stanley Hall’s work painted adolescents as vulnerable, immature and incapable of taking the responsibility of being a parent. She adds that by the 1930’s the Eugenics Movement led to the development of laws in 40 states that prohibited “lunatics,” “idiots,” imbeciles,” and the “feeble-minded” to marry and have children. Alfred Binet’s intelligence test was used to identify these individuals, but not

surprisingly, the people who “met the criteria” were the immigrants, the poor and low educated. By 1931 forced sterilization was legal in twenty-seven states; therefore, it was common to perform vasectomies on prisoners and to sterilize poor and minority women. According to Luker (1996), as these laws started to disappear in the 1960’s, doctors and social workers had taken on the task of deciding who could be a fit parent and therefore determine who needed to be sterilized. Again, the people who were most likely to be sterilized were African Americans and the poor and the disabled. There are records that girls as young as 12 years old were sterilized on the grounds that they were feeble-minded (Furstenberg 2007).

Luker (1996) explains that while sterilization was being forced on many poor and minority women, access to birth control was restricted mainly to well-off White women because they were the only ones who could afford it. She points out that many poor women were accused of having too many children; yet, birth control was not available to them until the 1960’s when fertility control was thought to be the answer for addressing poverty. In 1965 birth control became available to women receiving AFDC. But affordable birth control for all women was not available until 1970 when Title X became the largest source of public funds for contraception. The right to birth control for teens had been ambiguous until 1978 when Title X explicitly stated that adolescents had the right to affordable birth control. These laws regarding access to birth control clearly had an impact on fertility, especially among poor and young women.

Through her historical analysis Luker (1996) argues that teen pregnancy has become stigmatized as a socially deviant behavior endemic to mainly minorities and

poor women because the negative factors associated with teen pregnancy have been treated as a cause rather than a correlation. She explains that teen parents “are not middle-class people who have become poor simply because they have had a baby; rather they have become teenage parents because they were poor to begin with” (Luker 1996:108). Luker (1996) also points out that while poor young minority women are stigmatized as deviant women who want to live off the welfare system, society and social scientists have failed to acknowledge the rise of fertility in older women, whose pregnancies in fact have a higher risk for the mother and the newborn. These types of pregnancies are also more expensive because many older women require very expensive fertility treatments and high-risk medical care during the pregnancy.

This section of the dissertation shows that teen pregnancy is actually lower than it has ever been; yet, teen motherhood carries a stigma that portrays young mothers as social deviants. My review was mainly based on the studies of Frank Furstenberg (2007) and Kristin Luker (1996) who have been pioneers in the study of teen pregnancy and childbearing. According to Furstenberg (2007), perceptions of teen pregnancy as a social problem stems primarily from changes in the family structure. That is, it is a shift from young women getting married to young women having children but not getting married. Luker (1996) looks at other factors, such as changes in the construction of concepts that define what is considered to be fit or old enough to be a parent. She also points out that access to birth control and politically driven research agendas made minority women the target of this social problem even though out-of-wedlock childbearing was the logical product of economic and social circumstances.

However, Furstenberg's (2007) and Luker's (1996) works do not include anything about the fertility of Latinas. As they make the arguments that teen pregnancy became stigmatized by political, economic and social factors, their reviews do not explore the political, economic, legal and social factors that might have had an impact on teen motherhood among Latinas. The focus of their research was of African American women, perhaps because it was not until 1993 that the United States had accurate estimates of teen births among Latinas. Nonetheless, their analyses are important to this dissertation because they clearly show the importance of taking into account the social structure to understand teen fertility.

Some researchers have argued that fertility is best understood from an interdisciplinary perspective that merges the analysis of demography and social structure in a historical context (Elder 1978; Modell, Furstenberg and Strong 1978). I agree with this perspective; it seems evident that there is a very important gap in the literature of teen motherhood among Latinas. There is no research showing how social policies, such as access to abortion, birth control, medical services, unemployment among Latinos, and access to education might have had an impact on the Latina's teen birth rates despite a clear history of discrimination and segregation. This is especially relevant for fertility research because these discriminatory practices were very prevalent in the school system (Haney-Lopez 2003; Montejano 2010; Orozco 2009), and there is a clear link between education and fertility (Caldwell 1980; Rindfuss, Bumpass and St. John 1980). Future research should include the study of U.S. policies that have regulated access to

education, abortion, birth control and medical services. Equally important, there is a need to understand how immigration policies shaped the use of these resources.

The study of fertility among Latinas poses an interesting challenge for researchers. Unlike African Americans who have always been labeled as a distinctive racial group, Latinos are considered by many to be a “White” group, and this has especially been the situation with census data; in fact, Latinos are a minority group that faces as much inequality as African Americans do. Yet, living in a duality that classifies Latinos as “White,” but also as a minority, has pushed them in a unique category that brings greater complexity to their social problems and history. In the case of teen childbearing, prior to 1993, Latina mothers were treated as “Whites”; therefore there were no means to know the prevalence of the problem and no research to address it. Now that the evidence is available, Latinas are the target of this social problem when for many years there was no research nor social services and policies to help this community reduce teen pregnancies

In sum this section attempts to show the reader the need for historical research that links the social structure and teen fertility. Without this information it will be difficult, if not impossible, to fully understand and address teen fertility among Latinos.

### **Teen Fertility in Developed Countries**

The United States has the highest teen fertility rate of any developed country in the world (United Nations 2010), a rate of 41 births per 1,000 teenage women. Following the United States is England with a teen birth rate of 26 births for every 1000

teens (Figure 1). Like in the US, teen pregnancy in England caught the public's attention just as the birth rates started to decline in the 1970's. Since 1971 there has been an almost steady decrease in teen birth rates. In 1971 the birthrate was 50.6, but by 2005 the rate had decreased to almost one-half with 26.3 births per thousand teens (Arai 2009). Despite the steady decline, teen fertility has been an issue of concern for policy makers in the United Kingdom. Arai (2009) explains that the Tories (the conservative political party in England) wanted to reduce teen birthrates in half. Therefore teen fertility became a priority under the Health of the Nation (HOTN) initiative between 1992 and 1997. However, the Tories did not achieve their goal during their term in power. In 1997 when the Labor party was elected, teen pregnancy was also an important issue. But this time the Labor party had a new rhetoric to understanding teen fertility (Arai 2009).

According to Arai (2009) the conservative party approached teen pregnancy from a judgmental lens, which saw teen childbearing as an issue of sexual misconduct. On the contrary, the Labor party claimed to understand teen pregnancy as an issue of social exclusion. The Labor party developed the Teenage Pregnancy Strategy (TPS) in England, Wales, Scotland and Northern Ireland. This campaign was implemented under the assumption that there were three reasons for high teen birthrates, as follows: 1. The structural explanation understood that economic inequality leads to low educational and career expectations; 2. Ignorance, that is, a lack of knowledge about birth control methods and the difficulties of being a parent; 3 Mixed messages, namely, teens get messages that being sexually active is the norm. Arai (2009) categorizes these

explanations as structural, technical/educational, and social/structural. She argues that although the Labor party acknowledged these three reasons, their approach for the TPS focused only on the technical/educational explanations. In other words, the Labor party criticized the failure of the Tories, claiming that they did not understand issues of social inequality, but when the Labor party had to develop a solution, they took the same approach that the conservative party had taken. That is, the Labor party focused on changing individual behavior rather than changing the social structure to provide more social and economic opportunities for the youth. Arai (2009) explains that the party took this approach because it is the cheapest despite evidence that it does not work.

Arai (2009) explains that although the rates decreased slightly from 30.2 in 1997 to 26.3 in 2005, it is very difficult to attribute this decline to the party's intervention. She argues that this decline is consistent with all declines in fertility across Europe. And although the rates have declined, the rates in the United Kingdom (UK) continue to be the highest in Europe. Nonetheless, she argues that teen birthrates across countries should be compared with caution. She explains that countries with low teen birth rates like the Netherlands might be due to views about abortion. She reports that 40 percent of the teen pregnancies in the United Kingdom are terminated compared to 70 percent in the Netherlands. She also argues that sometimes the low teen birthrates in European countries are explained in terms of "sexual openness," despite the fact that the evidence of reducing teen fertility through sexual education is "weak" (Arai 2009:98). She adds that countries like Italy where there is one of the lowest teen fertility rates, the students do not have mandatory sexual education. In fact, parents can choose to take their



children out of those classes. Therefore she argues that the issue of teen fertility is too complex to seek solutions by modeling the approaches that other countries take.

Nonetheless comparisons across countries are common. Singh and colleagues (2001) conducted a study to compare factors that might be contributing to teen fertility in developed countries. They used descriptive and aggregate data to run bivariate relationships between five developed countries and key population indicators that have shown to be related to teen birthrates (Singh, Darroch and Frost 2001). The countries they included in their studies were Sweden, France, Canada Great Britain and the United States; and the variables were income distribution, unemployment rate, percent of illiterate population, percent of foreign-born population and distributions of income, school/work status, educational attainment and race and ethnicity. Their analysis had a number of limitations because the data are not perfectly comparable and the statistics are simple. Nonetheless, the authors concluded that teen childbearing is consistently related to poverty and social disadvantages in every country (Singh et al. 2001). They found that the greater the social disadvantage, measured by the proportion of poor people, the greater the rate of teen childbearing. They also found a correlation between educational attainment and delay in pregnancies (Singh et al. 2001).

Professionals interested in reducing teen pregnancy in developed countries seem to recognize that teen pregnancy is rooted in the social structure; however, there are different views on how to address the problem (Menkes and Suárez 2003; World Health Organization 2006). Singh and colleagues, (2001) conclude that economic and social disadvantages are strongly correlated with adolescent childbearing and therefore “are

worthy of policymakers attention”(Singh et al. 2001). They add that in Europe, policy makers do recognize this relationship; therefore, they work to increase the educational opportunities for adolescents beyond high school; in contrast, the United States focuses on reducing teen fertility through abstinence education and cutting welfare benefits. Singh and colleagues (2001) recognize that teen fertility is a complex problem, but they see the potential for addressing the problem in research based on social inequalities.

Aria (2009) also argues that the problem has its roots in social inequality, but she argues that the UK first needs to do more qualitative research exploring the meaning of motherhood. She believes that for some mothers, teen pregnancy can be a positive event given the social circumstances of the mother. She recommends that researchers be more critical about ‘scientific’ and ‘evidenced based’ research that shows teen pregnancy as a calamity. She believes that this type of research stigmatizes and ostracizes teen parents, which then can lead to a vicious cycle of marginalization and poverty. For Arai (2009) researchers need to explore how teen parenthood can be “positive and even rational in some contexts” (Arai 2009:138). She concludes, “Future policy efforts may be better placed (and more effective) if they are focused primarily on promoting the well-being of young mothers (and fathers) and their children and less on the depiction of teenagers as a problem” (Arai 2009:143).

### **Teen Fertility in Developing Countries**

Teen birth rates in developing countries vary considerably. In Latin American countries teen birth rates are as low as 42 in Cuba for the year 2006, and as high as 109

in Nicaragua for the year 2005 (United Nations 2010). For the period 2005-2010, the average in Latin American countries (including the Caribbean and other islands) was 72. But the highest teen birth rates in the world are found in Africa. Between 2005-2010, the average for all African countries was 136. The highest rate was 216 in Côte d'Ivoire and the lowest is found in Djibouti with 31 births per 1000 females. The world average is 71. The average for the least developed countries is 150 and 39 for the more developed countries (United Nations 2010).

According to the World Health Organization (WHO), 99 percent of maternal deaths occur in developing countries (World Health Organization 2006). To be counted as a maternal death, the death has to be related to the pregnancy and has to occur during the pregnancy or up to 42 days following the birth. In developing countries the risk of dying is twice as high for adolescents than for older women (World Health Organization 2006). According to the World Health Organization (2006), most of these deaths are related to a lack of medical care, poverty, unsafe abortions and no social support. Hypertension, malnutrition and infectious diseases are the most common diseases that lead to pregnancy complications. These risks are higher when the adolescents are less than 15 years old partly because their bodies are not fully developed (Igwegbe and Udigwe 2001; Mahavarkar, Madhu and Mule 2008). With a smaller pelvis, a younger woman has a greater risk of having an obstructed prolonged pregnancy.

This type of pregnancy is more likely to occur among women who live in poor rural areas where there is little or no access to emergency care. As a result, many women spend an average of 3.8 days in labor without medical care (World Health

Association 2006). Eventually their vagina, bladder and/or the area between the vagina and rectum can tear off. This leads to vesico-vaginal fistulas (VVF) or recto-vaginal fistulas (RVF). When a woman undergoes this type of complication, the baby is unlikely to survive and the mother is left with a fistula that can leak urine and feces. It is estimated that 50,000 to 100,000 women every year get fistulas due to labor complications, but the problem is most prevalent in Sub-Saharan Africa (World Health Organization 2006).

When the fistulas are not repaired, the life of the woman will become extremely difficult because she is stigmatized as dirty (UNFPA 2011). Women with fistulas are usually abandoned by their family and husband, and their life is in constant danger due to related health problems (World Health Organization 2006). There are a number of interventions that have been implemented to repair the fistulas. In 2003 the UNFPA – United Nations implemented a program specifically to decrease the number of women who are affected by fistulas. The program is called the *Global Campaign to End Fistula*, and the objectives are to increase resources to repair fistulas, to decrease the social stigma associated with this condition, and to delay pregnancies (World Health Organization 2006).

On the other hand, in some countries, teen motherhood is normal and necessary. For example, in a country like Lesotho, where life expectancy is around 30 years of age, having children in adolescence might be a means of survival for this population. Consequently I argue that demographic theories on teen pregnancy need to take into account the social, political and economic contexts of the group that is being studied.

Teen pregnancy in developing countries is different than in developed countries because it is complicated by socio-economic factors and the lack of access to medical treatment (Mahavarkar et al. 2008). Nonetheless, it is worth noting that researchers interested in addressing teen pregnancy in developing countries, recognize that teen fertility is rooted in social inequalities (Menkes and Suárez 2003; WHO 2006b).

### **Teen Fertility in Mexico**

I have reviewed the rates and challenges of teen birth rates in developing and developed countries. But since this dissertation focuses on Mexican origin women, it is important to examine the teen birth rates and trends in Mexico. In the year 2005, 17.2 percent of all births in Mexico were to females less than 20 years old (INEGI 2011a). Table 6 shows that the percentage of births to teen mothers has not changed much in the last 20 years (INEGI 2011a). In 1990, 18 percent of the total number of births in Mexico was to women less than 20 years old. At first glance these values seem very large; however, I urge the reader not to jump to conclusions without analyzing these numbers in the context of Mexico's demographic and socio-economic changes.

The stability of these values could be due to at least three reasons. First, it is should be noted that the infant mortality rate (IMR) in Mexico decreased from 39.2 deaths per 1000 births in 1990 to 14.7 in 2009 (INEGI 2011b). That is, twenty years later the infant mortality rate was reduced by 65 percent. As I explained earlier, teen women are more vulnerable to pregnancy complications, and these can often result in the death of the mother and/or the child. Therefore it is possible that the percentage of birth

to teens has not decreased; this is so not because adolescents continue to get pregnant at the same rate, but because the rate might be declining in the urban areas but increasing in the rural areas because teen mothers and their children are more likely to survive.

Second, developing countries face the problem that birth registrations are not always complete. Poor and isolated communities where teen pregnancies are more likely to occur (Núñez-Urquiza et al. 2003) are often less likely to register their children.

Therefore not having a decline in teen pregnancy might not be due to a lack of change in birth rates but rather it might be the product of better coverage in terms of birth registrations. Lastly, Mexico has developed a very aggressive fertility campaign making birth control more accessible to poor and rural populations. While this might be seen as a logical approach to reduce fertility in Mexico, the campaign could be having a paradoxical effect among teens. The birth control pill and the morning after pill are dispensed in Mexico without a prescription. An adolescent can walk into a pharmacy and easily obtain birth control pills. While birth control becomes readily available to adolescents, their likelihood of becoming pregnant might increase because they may lack the discipline required to take the pill.

The purpose of my presenting this interpretation of teen births in Mexico is to show the difficulties of comparing rates between countries. In this section I have reported birth rates in developing and developed countries; however, to fully understand teen pregnancy issues, the causes, symptoms and solutions should be studied in the context of each country (Arai 2009).

To this point I have written a literature review in terms of historical trends and how the issue of teen childbearing differs in countries outside the United States. I hold that these sections are important for understanding teen fertility because they provide a historical and social context. My goal for writing these two sections was to show the reader that views and policies on teen fertility have changed over time and social context. But most important, I wanted to highlight the importance of these two aspects for understanding teen fertility among Mexican-origin adolescents. In the historical section, it becomes evident that there is a gap in the literature of teen fertility for Mexican-origin teens because prior to 1993 most of the fertility was dichotomized into black and white. The section on international teen fertility shows that the context and extent of the problem vary depending on the social and economic circumstances of each country. Therefore I want to conclude these sections arguing that teen childbearing for Mexican-origin women cannot be fully understood without taking into account the social and historical context.

### **General Fertility Theories in Demography**

One of the main objectives of this dissertation is to identify some of the theoretical challenges faced by researchers face when studying the fertility of Latina adolescents, and in particular, that of Mexican-origin teens. In the section that follows, I will review briefly the most prominent fertility theories to demonstrate that although demography has sophisticated fertility theories, there is still a gap in the literature on the fertility of minority adolescents.

One of the most influential fertility theories is Demographic Transition Theory (DTT) developed by Warren Thompson in 1929 and revised by Frank Notestein in 1945. As it stands now, the theory states that there are four stages of mortality decline and fertility decline. According to this theory, the first stage is found in preindustrialized societies where there are high mortality rates and high birth rates, and hence very little, if any growth in the population. The second stage is found in societies that are starting to modernize. In these societies mortality rates start decreasing, especially infant and maternal mortality, but fertility remains high. Consequently there is rapid population growth. In the third stage population growth starts to decline because birth rates start to decline in the context of already low death rates. This pattern of fertility and mortality lead to the fourth and final stage where birth and death rates are low and there is low and stable growth. This last stage is mainly found in developed countries where they are at replacement levels (Poston and Bouvier 2010). The mortality and fertility declines as presented in DTT are mainly attributed to modernization and industrialization (Caldwell 1976; Mason 1997).

Another very influential fertility theory is John Caldwell's Wealth Flows Theory. Caldwell (1997) argues that in traditional societies, children contribute to economic and social resources; consequently, there is an incentive to have children. In more modern societies children take in the social and economic resources of the parents; as a result there is less motivation to have children. For Caldwell these decisions about fertility are driven by rational choices. Children are the primary economic beneficiaries; for that reason, in societies where it is expensive to have children, couples choose to reduce



fertility. Some of the criticism of this theory is that there is very little research testing its validity. The main problem researchers face when trying to test this theory is the fact that it is difficult to measure the perceived benefits of wealth flows across generations (Hirschman 1994).

In 1975 Richard Easterlin introduced another important theory of fertility. This theory is based on microeconomics and the *demand* for children (number of children couples would like to have), the *supply* (number of children couples can have without fertility limitations), and the *cost* of regulating fertility (economic, psychological and social costs) (Mason 1997). One of the major criticisms of this theory is that it is not clear what factors influence the demand for children (Hirschman 1994).

In 1956, Kingsley Davis and Judith Blake proposed a framework to understand the “intermediate” factors through which “social factors” influence fertility (Davis and Blake 1956). They proposed 11 intermediate factors which later John Bongaarts reduced to the four main proximate determinants, namely marriage, contraception, induced abortion and lactation, plus another three that were deemed to be much less influential (Bongaarts 1978). Bongaarts (1978) explains that these factors have a direct effect on fertility but they are mediated by “socioeconomic, cultural and environmental variables.” The purpose of this framework was to facilitate the analysis of factors that affect fertility changes.

The literature on fertility theories is extensive, but the above theories are the most prominent and widely used to understand fertility transitions. However, it is worth noting that these theories were developed to understand fertility changes across

countries. None of these theories are able to explain why groups sharing the same social structure and geographical area can have very different fertility rates. Moreover these fertility theories were developed to understand total fertility rates rather than fertility at a specific age. In other words, none of these theories can really help us understand fully why minority adolescents have fertility rates that are considerably higher than the majority group in the United States.

In attempts to understand the fertility of minorities in the United States, three demographic hypotheses have been developed, namely, the social characteristics hypothesis, the minority status hypothesis, and the sub-cultural hypothesis. Although these hypotheses were not developed to study teen fertility, they can provide a framework and point of departure for understanding teen fertility among minorities. In the section that follows I will review these three hypotheses.

### **Social Characteristics Hypotheses**

The first demographic hypothesis to be reviewed is the Social Characteristics Hypothesis. This perspective proposes that fertility rates are closely linked with social characteristics, such as income, education and occupation. It is argued that fertility differences should disappear when these variables are equalized (Bean and Marcum, 1978). This hypothesis is closely connected with socioeconomic characteristics and structural assimilation. In other words, the more structurally assimilated a racial/ethnic group is to the majority group, the closer the fertility rates will be to the majority group (Poston et al. 2006). On one end of the continuum, in its “strongest” form, this

hypothesis seeks to explain all the fertility differences in terms of socioeconomic characteristics. In other words, the hypothesis is that after controlling for the social characteristics of education, income and occupation, the differences in fertility between the majority and minority population should disappear. On the other end of the continuum in its “weakest” form, this hypothesis would predict that these changes will only be possible for minority members with higher socioeconomic status and who have become structurally assimilated. This occurs because structural assimilation occurs at a slower pace for groups with more economic disadvantages (Bean and Tienda 1987).

### **Minority Status Hypothesis**

The second hypothesis is the minority group status hypothesis. This hypothesis was first developed by Goldscheider and Uhlenberg (1969). They argued that minority groups with higher socioeconomic status tend to experience a socio-psychological effect of insecurity and marginality. As an over compensation mechanism, the minority group members seek equal status with the majority group and hence lower their fertility rates. That is, the most educated minority group members will be more likely to have lower fertility rates than the majority group with the same educational background. In Goldscheider and Uhlenberg’s words:

...the insecurities of minority group membership operate to depress fertility below majority levels when (1) acculturation of minority group members has occurred in conjunction with the desire for acculturation;(2) equalization of social and economic characteristics occurs, particularly at middle and upper social class levels, and/or there is a desire for social and economic mobility; and (3) there is no pronatalist ideology associated with the minority group and no norm discouraging the use of efficient contraceptives.(1969:372).

It should be noted that his hypothesis was first tested with data on African Americans, Japanese, and Jews, which according to Goldscheider and Uhlenberg “do not have specific norms or religio-cultural ideologies which encourage large families” (1996:368). Thus it remains to be seen whether this hypothesis applies to the Latino population. Moreover, as noted above, this hypothesis was not developed to be applied to adolescent fertility. The developers of this hypothesis explain that after controlling for education and income, the fertility rates and family size of the minority groups become lower than the majority group. However, for adolescents the socioeconomic variables are based on data of the parents. Therefore, there is a gap in the research to determine if this hypothesis applies to the children of those minorities who are highly educated. This is a particularly important question to address because as it will be shown below, there is a difference in educational attainment between first- and second-generation immigrants (Portes and Zhou, 1993).

### **Sub-cultural Hypothesis**

The third and last hypothesis to be reviewed is the sub-cultural hypothesis. The differences in fertility rates under this hypothesis are accounted for by the cultural norms and values of the minority group (Bean and Swicegood 1985; Bean and Tienda 1987; Hirschman 1994). For example, the cultural practices of Latinos make them more prone to adhere to religious practices that condemn birth control. Hispanics are said to be more likely to have extended families and therefore less likely to perceive having a child as a negative consequence. These values are assumed to be prevalent despite

socioeconomic differences and structural assimilation. This hypothesis, however, is considered a residual hypothesis. This means that it is not tested directly through empirical evidence. This hypothesis is supported if the aforementioned two hypotheses fail to account completely for fertility differences. In other words, if the social characteristics and minority hypotheses are not able to account for all the racial and ethnic differences in fertility rates, it is concluded that the remaining variation is due to sub-cultural differences specific to each of the ethnic or racial groups.

This conclusion however fails to explain exactly which factors of the culture contribute to teen pregnancy. Without specifying and testing the factors directly, we run the risk of attributing cultural characteristics to structural barriers. For example, the hypotheses reviewed above do not take into account that many Mexican adolescents do not have legal status; therefore, they will have to face almost unsurpassable barriers to be integrated into the “mainstream culture” (i.e. attend college, and have economic mobility). Without taking this social structural consideration into account, the sub-cultural hypothesis can attribute structural factors to “cultural” practices that put the blame on the minority group. This is especially important in terms of social policy because in order to address high rates of teen fertility one must be able to uncover the root of the problem instead of attributing the causes to cultural values for which there is no empirical evidence.

### **Teen Fertility Research in the United States**

One of the most comprehensive contributions to the understanding of teen fertility among minority groups has been the work of Arline Geronimus. Her work has mainly focused on understanding teen fertility among African Americans. Her research has led her to conclude that poverty influences many of the factors that determine adolescent pregnancy. She argues that high fertility rates among African American teens might be an adaptive response to the social marginalization that this population faces (Geronimus 1987; Geronimus 2003). She explains that in many cases an early pregnancy for African American adolescents has less negative consequences than delaying the pregnancy to their 20's or 30's (Geronimus 1986). To support her argument, she calls attention to the fact that African American families living in poverty are less likely to have access to healthcare, and, most important, their life expectancy is shorter than that of White Americans (Geronimus 1987; Geronimus 2000). She also states that the health of African Americans deteriorates sooner than for women of other races and ethnicities (Foster, Hagan and Brooks-Gunn 2008; Furstenberg 1992; Geronimus 2004). Therefore she concludes that when an African American woman has a child during her teen years, the adolescent can have more support from her parents and relatives (Geronimus 1987). When an African American adolescent postpones her pregnancy to her 20's and 30's, her social network shrinks significantly because the health of her family members often deteriorates. In other words, the people who in earlier years could have been a supportive network to raise her child are no longer able to provide this assistance. Under these circumstances African American women not

only have the challenge of raising their child without family support, but they also have the additional burden of taking care of their ill parents (Geronimus 1987).

Her argument echoes that of other researchers who argue that poor women prefer to have children, even if unmarried, because they do not have the same economic or professional opportunities of middle or upper-class women (Edin and Kefalas 2005). While the research of Edin and Kefalas does not focus on teen pregnancy, it supports Geronimus's argument that poverty and lack of opportunity for social mobility are critical factors in determining fertility for marginalized communities. Geronimus (2003) also argues that the European American culture condemns teen pregnancy because it is considered a barrier to attending college. However, she points out that the opportunity to attend college is not an option of all adolescents, particularly those living in poverty. Adolescents living in poverty have to overcome many social and economic barriers that teens with more economic resources do not have to confront. She explains that young adults who become aware that college is not an option for them cannot share the same values that White Americans hold. For some of these adolescents, having a child is the only option that they can envision. As others explain, it is difficult to ask "prudence" of adolescents who have few social and community opportunities (Bickel and McDonough 1997). Geronimus states that since disadvantaged African American teens do not have the same opportunities of majority adolescents, for many of them postponing child bearing is not an advantage (Geronimus 1997, 2004).

However Geronimus's work has not gone unchallenged. One of her critics is Frank Furstenberg. Although he agrees with Geronimus that a teen pregnancy is not a

direct path to a dire future, he has been very critical of Geronimus's claim that teen pregnancy is rational (Furstenberg 1992). Both authors seem to agree that people living in poverty have to adapt their values and goals to survive in their environment (Furstenberg 1992). They also agree that teen pregnancy is a response to poverty because delaying childbearing will not improve the social, economic and educational opportunities in which very disadvantaged women already live (Furstenberg 1992). But Furstenberg explains that Geronimus takes a "functionalist approach" which views teen motherhood for a black woman living in poverty as more advantageous than delaying childbearing (Furstenberg 1992). Furstenberg argues that early childbearing might be a response to social disadvantage, but he claims that Geronimus "overstates the incentives for early childbearing and understates the costs" (1992: 240). He explains that deviant behavior, such as drug use and prostitution, among others, can also be understood as an adaptation to social conditions, but it does not follow that this type of behavior is positive to the individuals or the group to which they belong (Furstenberg 1992). He argues that few teen mothers intend to have children at such a young age or more specifically few of them thought that it would be beneficial to them to have a child as a teenager. He adds that teens who end up pregnant might see some "immediate advantages," such as "attention from their family and peers, access to special services and encouragement from prospective fathers" (1992:240). But in general he argues that if teens "had to take a pill for a month to get pregnant" few of them would get pregnant and few parents would encourage the teens to take the pill (Furstenberg 1992:240).



Furstenberg (1992) adds that to see teen motherhood as culturally rational for African Americans because it ensures lower birth risks and more family support, Geronimus would have to show a causal relationship. That is, Geronimus would have to show that these advantages are the reasons why African American teens choose to have children at an early age. However, Furstenberg argues that Geronimus has failed to make her case (Furstenberg 1992). He also points out that there are methodological problems with the statistics that Geronimus uses to show that having children in adolescence lowers the risk of pregnancy complications. He also explains that there is no evidence that teens in fact have greater social support than if they delay their pregnancy. He adds that Geronimus's claims seem to ignore the social and economic strains that teen childbearing can bring to the family that is supporting the teenager. Last Furstenberg argues that Geronimus undermines the consequences of teen childbearing stating that the social and economic circumstances of a woman who as a child in her teens would not be any different than if she waits. Furstenberg (1992) endeavors to refute Geronimus's argument that teen mothers' chances for upper economic and educational mobility will not be improved by delaying the birth; he argues that Geronimus's conclusions are based on a biased sample. He cites his own study in which he found that women who delayed their pregnancy had greater chances of completing high school and attend college (Furstenberg 1992).

Geronimus (1992) responds to Furstenberg (1992) stating that she is not arguing that there are not economic consequences to teen motherhood. She explains that there are no good studies to truly understand the effects of teen childbearing. Moreover, she

states that she is not advocating early childbearing; instead, she is advocating ‘*reproductive freedom*’ (Geronimus 1992).

Furstenburg has been studying teen fertility for several years. In 1966 he started a longitudinal study that followed disadvantaged African American women for over 30 years. While in 1992 his research showed that women who delayed their pregnancy to their adult years had an educational and economic advantage, fifteen years later Furstenberg (2007) found that delaying pregnancy for teens living in poverty would only have marginal effects in improving their social, economic and educational prospects. In other words, both Geronimus and Furstenberg have found that teen pregnancy might not be the direct cause of poverty and low educational attainment; instead they find that women who become pregnant are already in very difficult economic and social circumstances and delaying pregnancy might not be an advantage to them. In the words of Luker, “...although it is true that young mothers tend to be poor women, it is much more meaningful to say that poor women tend to become young mothers” (1996:12).

Although the work of Arline Geronimus and Frank Furstenberg have made a very important contribution to understanding teen fertility for African Americans, their work does not address the issue of why the rates of teen fertility are higher among Mexican origin teenagers than any other racial or ethnic group (Driscoll et al. 2001). In the section that follows I will review the literature on teen fertility that focuses on Latinas.

### **Latinas' Teen Fertility**

There is a large amount of literature on Latinas' teen fertility. But my review of the literature shows that while teen fertility for African Americans is understood as an adaptation to social disadvantages, teen pregnancy and fertility of Latinas are primarily understood in terms of cultural values (Upchurch et al. 1998; Yang and Gaydos 2010). It is difficult and perhaps unproductive to speculate why this is the case, but I hold that this difference in the perspectives used for these two minority groups has important social policy implications. If the problem is viewed as a consequence of social disadvantage, social policies will be directed to improve issues of poverty, but, alternately, if the problem is presented in terms of differences in culture or acculturation, the blame is placed on the victims (the Latino culture). This hence halts any attempts to develop social policies to address this social problem. Below I review my findings when I cover the literature on Latinas' teen fertility.

When one conducts a literature review on Latinas' teen pregnancy and fertility, most of the articles study the problem as if the majority of the Latino youth in the United States was foreign born, and they address the issue in terms of cultural values or acculturation. For example, Latinas tend to be described as foreigners who have been unable to learn the language of the host country. One study reads, "Latinas that are more acculturated are more likely to have better English speaking skills and may navigate the U.S. health care system with more confidence" (Sterling and Sadler 2009:23). The authors are implying that not knowing English is a handicap for access to health services, which might be true. But the reality is that very few Latino adolescents are

actually foreign born; consequently, most Latino adolescents, if given the opportunity to have a normal upbringing, would have the ability to speak both English and Spanish fluently. In other words, articles of this type are putting the responsibility on Latinos rather than illuminate the factors and policies that make it difficult for adolescents to speak both languages.

I found one study by investigators from the Division of Reproductive Health, at the Center for Disease Control and Prevention and Child trends of the U.S. Government. These are the major agencies responsible for conducting research that is used to develop social policies for Latino youth. The objective of their study was “To explore relationships between immigration measures and risk of reproductive and sexual events among U.S. Hispanic Adolescents” (McDonald, Manlove and Ikramullah 2009:14). Their main independent variables were generation, language, and country of origin. They concluded that these variables are good predictors of sexual risk behaviors. They estimated seven logistic regression models with different dependent variables. Out of all those models, only one variable produces a significant effect for first generation and one for country of origin. These findings are likely to have happened by chance given that so many models were estimated, and there was no pattern or theoretical framework to explain their findings. But what is most intriguing is the fact that these variables focus on immigration measures when only 15 percent of their sample was foreign born.

Other authors acknowledge that the literature has been inconsistent regarding sexual risk behavior for Latinos (Guilamo-Ramos et al. 2005). They explain that some studies find that acculturated teens have a higher risk for sexual risk behavior, while

other studies show that they have a lower risk than non-acculturated teens. They claim that the findings have been inconsistent because the studies have not been undertaken with nationally representative samples. Although this might be a reasonable explanation, the authors fail to consider the possibility that the findings might be inconsistent because there is measurement error. In other words, studies based on acculturation might not be capturing real issues that the adolescents are facing. Instead the authors use The National Longitudinal Study of Adolescent Health (Add Health) data, which is a nationally representative sample, and once again they test for the effects of acculturation (“exposure to the host country” measured in terms of years in the US, and “acceptance of the host country culture” measured as English spoken at home) (Guilamo-Ramos et al. 2005). Their conclusions are somewhat amusing because they claim to use a nationally representative sample to resolve the problem of conflicting results between acculturated and not acculturated teens. But they conclude, “Among recent immigrants, youth from English-speaking homes were less likely to be sexually active than those from Spanish-speaking homes. The opposite was observed from youth who were born in the United States or who had resided in the United States most of their lives” (2005:88). They seem to think that they have made a contribution to the literature because they separated the effects of foreign born and U.S. born and language spoken at home, but this information does nothing to help understand why the results in the literature have been inconsistent. They add to the many studies that conceal the real issues Latino teens are facing because the studies cling to the idea that most Latino youth

are foreigners and that acculturation is the key factor for understanding their social structure.

The above examples are not isolated examples; most articles on Latino youth are based on acculturation measures. Some articles state that acculturated adolescents engage in more risky sexual behavior, while less acculturated adolescents have a lower risk for pregnancies, early sexual activity and fewer sexual partners (Jimenez, Potts and Jimenez 2002; Kaplan, Erickson and Juarez-Reyes 2003). Others state the opposite (Brindis et al. 1995). And still others show a more complex relationships; less acculturated adolescents have the lowest rate of sexual activity, but the highest birth rate (Aneshensel et al. 1990).

Linda Hunt and colleagues (2004) conducted a systemic review of the use of acculturation variables in health research. They reviewed articles published between 1996 and 2002 using such keywords as acculturation, Hispanic/Latino and Mexican American. They reported that 66 percent of the articles they reviewed did not include a definition of acculturation. The other articles had only very vague definitions. For example, in my review of the literature a typical definition of acculturation was, “The process of acculturation involves retaining or separating from country of origin gender roles and other cultural norms while at the same time resisting or acquiring new host country norms” (McDonald et al. 2009:14). Hunt and colleagues (2004) explain that these usual definitions of acculturation have four problematic assumptions: 1) two distinct cultural groups are compared, 2) each group has identifiable traits, 3) two groups become in contact, and 4) old traits are replaced by new traits. The authors point out

several problems with these assumptions. First, they note that to compare two different cultural groups there has to be a definition of culture. However, they found that only eight percent of the articles gave a definition, and these still were very ambiguous. They explain that there should be at least a definition of the “ethnic” and “mainstream” cultures. However, the ethnic culture is usually defined based on unsubstantiated and broad claims of stereotypical behavior and the definitions of the “mainstream” [culture] are strangely absent altogether from this literature” (Hunt et al. 2004: 977). The second assumption is that the two groups can be identified and labeled, but the authors point out that such labels make broad categories that ignore the heterogeneity in each group. The third problem is that acculturation measures assume new contact between two groups. However, the authors explain that such assumptions are inappropriate. For example, most studies assume Mexicans as immigrants ignoring the long history of “permeable” borders that have resulted in a very diverse Mexican-origin population. That is, some people are native to areas that once belonged to Mexico, others are second or third generation, and the minority are born in Mexico. Last the authors explain that acculturation assumes the replacement of the old values with the new values. However, the new and the old are never specified, nor do the authors using the acculturation concept bother to explain how old values might have changed throughout history. But what is most important, Hunt and colleagues point out is that health research “consistently characterize Hispanic culture either as a ‘source of dysfunction’ or as a therapeutic panacea” (2004:980). While the review by Hunt and Colleagues (2004)

focused on health articles rather than on teen fertility, their findings are consistent with my review of Latina's teen fertility.

My review of the literature also found that most studies trying to measure acculturation are in fact measuring stereotypes. For example, one study states that “Cultural factors that influence adolescent Latinas’ contraceptive use include male-dominated Latino culture (and the relative powerlessness of Latinas), the cultural emphasis on the family and motherhood, religion, societal disapproval of extramarital sex, and lack of access to contraceptive care or information” (Sterling and Sadler 2009:22). Other studies claim that the mother is submissive and the father is the bread winner (Kaplan et al. 2003). One study did not find that school and professional aspirations had any effect on Latinas’ fertility; therefore, the author concluded that “This pattern suggests that Mexican American girls – unlike girls from the other racial and ethnic groups - are being socialized for marriage and childbearing to the exclusion of work related or school-related roles” (East 1998:159). I also found a study asserting that familism, respeto, chastity, virginity until marriage, and traditional gender roles are all the core of the Latina/Mexican culture (Ortiz and Vazquez Nuttall 1987). The most problematic aspect of these claims is that they are completely unsubstantiated and unscientific. They do not provide evidence to demonstrate that their assertions are true, nor do they provide a theoretical framework to guide research that can explain how these “cultural values” would have an effect in adolescent development. But what is most concerning about this type of research is it delays scientific progress in the field.



As Hunt and colleagues (2004) point out, one of the main problems of studying adolescent fertility in terms of cultural values or acculturation is that there is no clear definition of culture. Nor is there a theoretical framework that can explain how a culture changes and how cultural practices differ from responses to social constraints. For example Geronimus (2003) claims that teen childbearing for African Americans is a cultural adaptation to social disadvantage, but teen fertility of Latinas is assumed to be the product of cultural values from the country of origin or the origin of the parents. In demographic research the cultural hypothesis seems to be accepted as a residual without any concern about its implications. In other words, by accepting that everything that cannot be explained by socioeconomic factors is therefore a cultural effect, we are failing to identify the policies or social issues that might be influencing the effect but are beyond the control of the people being studied.

Some studies on adolescent health have applied Portes and Zhou's (1993) theory of segmented assimilation (Denner et al. 2001; King and Harris 2007; Michelle 2009; Xie and Greenman 2011). This theory attempts to explain the differences in assimilation patterns between first and second-generation immigrants. This framework claims to be able to explain the differences in assimilation patterns among different minority groups (Portes and Zhou 1993). Portes and Zhou (1993) identify three paths to assimilation. The first is the direct assimilation into the main White-middle class; the second is a direct path to poverty and underclass; and the third, economic mobility, has close ties to the culture of origin. According to Portes and Zhou (1993: 83), "there are three features of the social contexts encountered by today's newcomers that create vulnerability to

downward assimilation. The first is color, the second is location, and the third is the absence of mobility ladders.” While these factors can be viewed as structural barriers, Portes and Rumbaut emphasize the social characteristics of the ethnic group. In their own words, “Social capital grounded on ethnic networks, provides a key resource in confronting obstacles to successful adaptation.”(Portes and Rumbaut 2001:64). They also view human capital as a critical component in the assimilation process. Human capital refers to the skills and education that each immigrant group brings to the host country. It is assumed that the more educated and highly skilled a group, the more likely it will assimilate to the mainstream American social structure, i.e., they will achieve equal educational and economic status as the Anglo majority. According to this theory, Mexican-origin teens are more prone to downward assimilation.

While this is a highly cited sociological theory, I hold that it is highly problematic for the understanding of adolescent behavior. First, Unger (2007) and colleagues point out that although acculturation and assimilation measures are widely used, there is no consensus on how to measure this theoretical construct. They explain that acculturation and assimilation are usually measured with proxies such as language spoken at home, cultural identity and “ways of life,” i.e., preference for television shows, food, and holiday celebrations. However, their analysis of these measures showed that these are “only modestly correlated” (Unger et al. 2007:562). They conclude that several measures of acculturation should be used to capture the complexity of acculturation. However, I propose a different perspective. I think the reason why these measures do not correlate with one another is the fact that the acculturation theories are

not clear on how the acculturation process occurs. As was discussed earlier, the most basic concept, a definition of culture, is nowhere to be found. Without a strong theoretical framework it is difficult, if not impossible, to develop an acculturation measure, as it is unclear as to what exactly needs to be measured.

But for the sake of the argument, if we accept that Language and nativity tell us something about adolescents in terms of their integration to the social structure of the United States, one finds other problems. If language spoken at home is used as a proxy for acculturation, it is assumed that Spanish-speaking homes are less acculturated than English speaking homes. However, this measure does not capture people who are fluent in both languages, but choose to speak only English or only Spanish at home. This measure also does not capture if the person has an accent in Spanish or in English. People who are fluent, but have an accent, are going to face different barriers and even more discrimination than those without an accent. When nativity is used to differentiate native born from foreign born, this variable cannot distinguish youth who live in areas where there is a large percentage of Mexican origin people from areas where there is only a small percentage of people with the same ethnic background.

In sum, in my review of the literature I found the concept of culture is readily used without any real awareness that the concept is not easily measured. In response to this problem, E. A. Hammel stated, “the use of ‘culture’ in demography seems mired in structural-functional concepts that are about 40 years old, hardening rapidly, and showing every sign of fossilization” (Hammel 1990:456). In his article he attempts to provide a framework to help demographers use culture in a more systematic matter.

However, his efforts seem to have been futile because there is still no clear definition of culture when the fertility of Latinas is studied.

Frank and Heuveline (2005) have tried to challenge the cultural values argument by pointing out that in Mexico the total fertility rate is lower than it is for Mexican-Origin women in the United States. They claim that higher fertility rates among Mexican-origin women in the U.S. cannot be explained by pronatalist cultural values. Instead they propose that the discrepancy in fertility rates is “more a product of structural factors that are unique to Mexican American community in the U.S.” (Frank and Heuveline 2005:99). Their argument is based on the fact that Mexico has experienced a rapid fertility rate decline while the fertility rates of Mexican-origin women in the U.S. remain high. They report that the total fertility rate in Mexico has decreased from 7.3 in 1960 to 2.4 in 2000. The underlying assumption of Frank and Heuveline’s (2005) argument is that if culture affects high fertility, one would expect to have high fertility rates in the country of origin where pronatalist values are reinforced. While this conclusion might seem reasonable, I argue that Frank and Heuveline’s argument has some logical flaws.

In their paper they acknowledge that the fertility rate in Mexico has decreased because Mexico initiated an aggressive campaign for family planning. In addition, they explain that people from rural areas in Mexico have higher fertility than women in urban areas. Therefore, one could conclude that even if the total fertility rate has changed in Mexico, Mexican-origin women in the US might come from the rural areas where the fertility is higher and/or might possess the pronatalist values that existed before the

family planning campaign was begun. They claim that women in the U.S. have higher fertility because they are being marginalized; however, one could argue that Latinas in the U.S. might just be experiencing more reproductive freedom than in Mexico. A fertility expert in Mexico, German Vaquez Sandrin (2010), explains that the fertility decline in Mexico might also be an indication of abject poverty. He argues that the fertility rate for poor people, and especially that of the indigenous communities, has declined because people do not have money to support their children.

My objective is not to deny that Mexican origin women in the United States might be experiencing multiple social barriers and marginalization that make it less attractive to reduce their fertility. My goal is to demonstrate that we cannot address the cultural argument comparing the fertility of women in Mexico with the fertility of Mexican-origin women in the United States. To do so is to accept that the demographic literature has successfully presented an acceptable definition of culture. In other words, when Frank and Heuveline (2005) compare the U.S. rates with the Mexican rates, they are implying that the Mexican fertility rates are the standard of “Mexican culture.” Yet, they do not define culture. Holding the fertility rates as the standard or representation of Mexican cultural values has two major problems. First, it assumes that the Mexican culture is homogenous, and second it fails to see that some of the current low fertility rates in Mexico might be the product of structural barriers rather than “cultural” values.

I respect Frank and Heuveline’s efforts to address the cultural argument. However, I insist that without a clear definition of culture and a theoretical framework that helps one understand the differences between cultural values and behavior adopted

in response to the social structure and barriers, the cultural argument should not even be considered worthy of scientific enquiry. If demographers accept the cultural hypothesis as a residual, the cultural explanation becomes a wildcard that can be used to *explain* everything that we *cannot understand*. Therefore I propose that in order to make progress in understanding the fertility of Mexican-origin women in the United States, researchers need to identify the possible barriers that are affecting the fertility of Latinas in the United States and then develop a hypothesis that can be tested.

Consequently, I propose that given that the only finding that has remained consistent in fertility studies is the relationship between education and fertility (Blossfeld and Huinink 1991; Caldwell 1976; Caldwell 1980; Cleland and Rodriguez 1988; Hirschman 1994; London and Hadden 1989; Marini 1984; Rindfuss et al. 1980; Rindfuss, Morgan and Offutt 1996), it would be important to test this relationship in teen fertility.

A number of studies have found a negative relationship between educational aspirations and teen fertility (East 1998; Liebowitz, Castellano and Cuellar 1999; Phipps et al. 2011; Young et al. 2004). Rindfuss and colleagues (1980) explain that the causal relationship between fertility and education is very complex. They write that this relationship can be traced to preteen years when young women start contemplating their educational aspirations. However, they note that those educational aspirations are influenced by a number of factors, including parents' education, income, educational experiences and aspirations. Nonetheless, the way that education affects fertility is still not clear. Some argue for a cost-benefit effect where fertility delays can be explained in

terms of economic incentives. That is, women who have more career opportunities or better prospects for economic conditions are more likely to delay childbearing (Blossfeld and Huinink 1991; Caucutt, Guner and Knowles 2002). Others note that the relationship is even more complex and most likely bidirectional since education can affect the timing of the first birth, but also that the first birth can affect educational attainment (Marini 1984).

The mechanisms that can explain the relationship between education and fertility are clearly complex. If teen fertility is viewed from a public health or medical sociology perspective, one also finds that education is critical for better health (Mirowsky and Ross 2003b). However, the mechanism through which this effect is believed to take place is different from studies in the demographic literature that emphasize cost and benefits. The work of Mirowsky and Ross (2003) does not treat the effect of education in terms of economic gains. In their work, people with higher education have better health, but not because they have more money or access to medical resources. Instead they argue that health is improved with education because education increases *human capabilities*. Their work is based on the work of Amartya Sen (1999), who has written the following:

...human capital tends to concentrate on the agency of human beings in augmenting production possibilities. The perspective of human capability focuses, on the other hand, on the ability – the substantive freedom to lead the lives they have reason to value and to enhance the real choices they have. (Sen1999:293).

He adds that human capabilities are directly connected with the well-being of individuals and indirectly connected to the enhancement of economic production (Sen

1999). Health and education are the key factors to increase human capital and human capabilities. However, the underlying determinant is education because it provides the cognitive skills to read, communicate, argue, organize information and therefore make more informed life choices. In sum, education is of great importance for stimulating development and also for the improvement and quality of life of individuals.

Although this perspective has not been considered in the demographic literature, my background in medical sociology has led me to hold that this theoretical perspective needs to be taken into account to better understand the fertility of women. This perspective is more precise, explaining how education might well work through no economic incentives. Under this prospective the relationship between education and fertility would be seen as being driven by the acquisition of capabilities that allow women more freedom to choose how they want to live their lives, while the cost-benefit perspective assumes that the incentive is based in economic gains.

Having established the relationship between education and fertility, it becomes critical to recognize that Latinos in the U.S. face multiple barriers in the educational system. The educational barriers that minorities encounter in the United States have been well documented by a number of researchers (Gandara and Contreras 2009; Perez 2009; Romo and Falbo 1996; Saenz 1997; Suarez-Orozco, Suarez-Orozco and Todorova 2008; Valenzuela 1999). They include tracking students into classes that will not prepare them to attend college, discrimination, denying students the opportunity to connect with their roots, i.e., to speak Spanish, not giving parents the resources to help their children or advocate for them in the school system, unqualified teachers in low income schools, not



allowing undocumented students to attend college, among many others. Yet, the relationship between these barriers and reproductive health or fertility has not been studied.

## **Conclusion**

In this dissertation I propose to test the relationship between teen fertility, socioeconomic status and access to higher education. Although other studies have already studied these types of relationships (East 1998; Liebowitz et al. 1999; Phipps et al. 2011; Young et al. 2004), in my dissertation I will attempt to make a contribution to the literature addressing some of the limitations of previous studies.

First, there is a need to conduct research that tests demographic hypotheses that can identify solutions to inform social policies. As it was noted in the review of the literature, the demographic literature tends to attribute differences in fertility mainly to cultural factors. This type of research is not able to identify how the social structure is contributing to high rates of teen fertility among Latinas. Consequently, I first will test the social characteristics hypothesis to determine if socioeconomic factors contribute to the fertility rate differences between Latinas and non-Hispanic White teens. In the testing of this hypothesis, I will control for factors that have been found to be related to sexual activity, namely religion and religiosity (Bean and Tienda 1987; McIntosh, Alston and Alston 1979; Ortiz and Vazquez Nuttall 1987; Rostosky, Regnerus and Wright 2003). This type of analysis allows me to separate the effects of social characteristics and the effect of religion and religiosity.

My dissertation will also address some methodological problems commonly found in the literature. Income is missing in most data sets; as a result, many studies either delete the cases with missing data or use parents' education as a proxy of income (Brindis 2006; Casares et al. 2010; East 1998; King and Harris 2007; McDonald et al. 2009; Okunade 2009; Perreira, Harris and Lee 2007; Rees 2011; Vaquera 2006; Waddell et al. 2010; Wahl 2010). In the next chapter I will explain why these techniques are inappropriate and will address this issue by using multiple imputation.

In addition, I will use a nationally representative data-set that allows me to study only Mexican-origin adolescents. Previous studies used small convenience samples mostly in California (Dehlendorf et al. 2010; East 1998; Gilliam 2007; King and Harris 2007; Ortiz and Vazquez Nuttall 1987; Waddell et al. 2010).

A great deal of research on teen pregnancy and birth rates among Latinas is descriptive or correlational (Hoffman 1998). As a consequence, differences in behavior are often attributed to cultural values because the studies do not control for social characteristics, such as household income. In this dissertation, I will use a variable that represents a culturally ascribed pronatalist value (Ryan, Franzetta and Manlove 2005), and, moreover, I will control for income to assess if the values are related to socio-economic status or "cultural differences."

One of the main objectives of this dissertation is to initiate a line of research dealing with Latino youth that focuses on identifying solutions to address the issues of Latino youth instead of focusing on identifying "cultural" differences that either blame the culture or hold the "culture" responsible for the solution. The objective is to identify

factors that contribute to social inequalities and which, in turn, might contribute to differences in teen birth rates in Mexican-origin adolescents. Therefore in my dissertation I will also analyze if aspirations to attend college and negative educational experiences have an effect on predicting a teen birth. Moreover, I test the effect of having a teen birth on the odds of completing a college degree and compare the effects for Mexican origin teens and Whites.

In the following chapter I will describe in detail the data and methods that I have used to undertake the quantitative analyses.

### CHAPTER III

#### DATA AND METHODS

In this chapter I describe the data and methods used in the quantitative analyses presented in this dissertation. First, I will describe the data used, and then the methodology. Last, I will review the most widely used methods of handling missing data and describe their advantages and limitations.

#### **Data**

The analysis in this dissertation uses data from the National Longitudinal Study of Adolescent Health (Add Health) (Harris 2009). The dataset is a nationally representative stratified random sample of adolescents in the 7<sup>th</sup> through the 12<sup>th</sup> grades who were followed across three waves between 1995 to and 2009. The data were first collected from 80 high schools and 52 middle schools and junior high schools across the United States, including Hawaii and Alaska. Schools became the primary sampling unit. Data in the first wave were gathered in two stages. At the first stage more than 90,000 students completed a self-administered questionnaire in their schools. In the second stage these students and those who had not completed the questionnaire were eligible for the core sample. The students were then stratified by grade and sex. After the stratification had been implemented, approximately 17 students were randomly selected from each stratum. Approximately 200 students were selected from each school and this sample comprised a total of 12,105 adolescents in the 7<sup>th</sup> through the 12<sup>th</sup> grades that was

representative of the U.S. adolescent population with regard to age, sex, and school type. In addition, the data included an oversample of Black students whose parents had a college degree, an oversample of adolescents of Chinese, Puerto Rican and Cuban descent, and an oversample of students with disabilities. Moreover, siblings living together were oversampled. Last, to facilitate the analysis of social networks, the first wave included a saturation sample where all the students in the school were selected for the core sample. After oversampling a total of 20,745 nationally, representative adolescents were interviewed (Harris et al. 2009).

The interviews lasted approximately 2 hours and were conducted with laptop computers. For sensitive questions, the participant used a set of headphones and entered the answers on his or her own. In the first wave, mothers or main caretakers were asked to take part in an individual interview, but only 17,760 of the total sample agreed to participate. Mothers were asked to participate because it was assumed that they would be more knowledgeable of the students' lives. In addition, the first wave included an interview of school administrators; however, I did not use these data in this dissertation (Harris et al. 2009).

The second wave of data was collected between April and August of 2006. At this stage 14,738 students were interviewed. Students in the disabled sample of the first wave, and those who were in the twelfth grade during the first wave, were not asked to participate. No data were collected from the parent or caretaker. The third wave of data collection was conducted between August 2001 and April 2002. The sample included 15,197 young adults between the ages of 18 and 26 years old, all of whom had

participated in the first wave. The sample included participants who were in prison, but excluded those who were overseas. Research participants were paid \$20.00 each if they agreed to participate in the study. Parents were not interviewed at this stage. Wave IV was collected in 2006-2007. At this stage the students who had participated in Wave I were 24-32 years old. A total of 15,701 adults from the original sample were interviewed (Harris et al. 2009).

The Add Health dataset provides sampling weights that compensate for non-response across waves (Paul and Aragon-Logan 2011). This design allows researchers to choose between a cross-sectional, longitudinal, time-series, or multilevel analysis (AddHealth 2004; Chantala 2006; Chantala and Tabor 1999). While the study can adjust for non-response bias between waves, it does not compensate for the fact that only 17,760 out of 20,745 parents agreed to participate in the study. Therefore researchers posing questions that require parental information, such as income or education, face the challenge of having a large amount of missing information (Conde 2009, 2011).

In my dissertation I only used data from waves one and four. The independent variables were taken from wave one, and the dependent variable was taken from wave four. In the following section I will describe the models and their respective hypotheses.

## **Method**

Four hypotheses are tested in this dissertation. First I will describe the hypotheses. Second I will describe the type of analysis that was used, and last I will provide a detailed description of the variables that were used and how they were coded.

First, I tested the social characteristics hypothesis (Bean and Tienda 1987). This hypothesis states that after controlling for social characteristics, the differences in fertility between non-Hispanic Whites and Latinos should disappear. The second hypothesis concerns a culturally ascribed value. Under this hypothesis I tested if Mexican-origin teens are more likely to report that a teen pregnancy “would not be so bad.” This type of statement has been associated with pronatalist views (Ryan, Franzetta and Manlove 2005). I hypothesize that after controlling for income and other variables in the model, the odds of making this type of statement will be no different for Whites and Mexican-origin teens. Third, I tested the effect of educational experiences and aspirations on the odds of having a teen birth. I hypothesize that the greater the educational aspirations, the lower the odds of having a teen birth (Rindfuss et al. 1980). Moreover, I hypothesize that students who have repeated a grade or have been held back are more likely to have a teen birth than those who have not (Romo and Falbo 1996). Last, I test the effect of having a teen birth on the odds of not graduating from college. I hypothesize that having a teen birth will increase the chances that a woman will not graduate from college. In addition, I examined the interaction between having had a teen birth or not and race and ethnicity. The purpose of this was to determine if having a teen birth has a different effect for non-Hispanic Whites and Mexican origin teens. To ease interpretation, after the interaction effect is examined, the analysis is repeated splitting the samples into non-Hispanic Whites and Mexican origin teens.

These four hypotheses were tested using logistic regression. The dependent variable for the first hypothesis is whether or not the adolescent had a teen birth, coded 1

for yes and 0 for not. The sample for the first hypothesis was restricted to non-Hispanic White, African American and Mexican-origin females who had or did not have a live birth between the ages 15-19. Non-Hispanic whites were used as the reference group. For the first hypothesis, the independent variable was household income as reported by the parent in wave one. This variable was entered as a ratio and measured in thousands with 100,000 as the ceiling.

The sample for the second hypothesis concerning a culturally ascribed variable included only Mexican-origin teens and non-Hispanic White participants. Again Non-Hispanic Whites were used as the reference group. The dependent variable was the response to the statement “it would not be all that bad if you got pregnant at this point in your life.” Adolescents who agreed with this statement were coded as 1, and those who did not were given a score of 0. The sample for this hypothesis was restricted to adolescents who were 15 years or older at the time of the interview because younger research participants were not asked this question. The independent variable is race and ethnicity because the purpose of this hypothesis is to test if Mexican origin teens are more likely to make this type of statement.

The third hypothesis tested the effects of educational aspirations on the odds of having a teen birth. The samples only included Mexican-origin teens and non-Hispanic Whites. Non-Hispanic Whites were used as the reference group. The first independent variable for this model was perceived likelihood to attend college. This variable was assigned ordinal codes, with 1 as the lowest category and 5 as the highest. The second independent variable was whether or not the adolescent had been held back or repeated a



grade, 1 for yes and 0 for no. The analysis was conducted with two samples. The first sample excluded adolescents who had had a teen pregnancy before or around the time of the interview. The purpose of excluding these adolescents from the sample was to reduce the bias on responses about college aspirations. It is possible that the responses of teens who had had a teen pregnancy might have been influenced by their pregnancy. The second sample included all adolescent females. This was undertaken as a form of sensitivity analysis to determine the extent of the bias that might have been introduced by the timing of the pregnancy.

The fourth and last hypothesis tested the effects of having a teen birth on the odds of not graduating from college. The dependent variable was whether or not the participant graduated from college. Those who did not graduate from college were given a score of 1 and those who graduated a score of 0. As in the previous two hypotheses, the sample was restricted to Mexican origin females and non-Hispanic Whites, and latter group was used as the reference group. The key independent variable was teen motherhood. Teens who had had a teen birth were given a score of 1 and those who did not a score of 0.

All the models controlled for the mothers' or caretakers' education, and adolescents' age, religiosity and religion. The parent's education variable was entered as reported by the parent in wave one and was coded by year. In other words, parents who reported never attending school were assigned a value of zero, parents who reported eight years or less of education were given a value of eight; parents who had more than eight years of school but did not have a high school diploma were assigned a value of

11; parents with only a high school diploma or GED were given a value of 12; parents who had some college experience or some technical training beyond high school had a value of 14; parents with a college degree had a value of 16; and finally parents who had graduate education were assigned a value of 18.

The variable on the importance of religion was based on data from the question “How important is religion to you?” Responses were coded as follows: students reporting no religious affiliation or who responded “not important at all” had a value of 1; adolescents who responded “fairly unimportant” had a value of 2; teens who responded “fairly important” had a value of 3; and participants who answered “very important” were given a value of 4. In addition, the adolescent’s religion was entered as dummy variables using six different coding categories (Steensland et al. 2000), namely, no religion, Protestant, Evangelical Protestant, Black Protestant, other religion, and Catholic. The Catholic dummy variable was used in the equations as the reference group. The variable for age was entered in years. The last three hypotheses also included household income as a control variable, and this was entered as noted in the description of the first hypothesis. Furthermore, to account for differences in the value of income, I controlled for whether or not the parent was able to pay the household bill. Those who reported that they had enough money to pay their bills were coded as 1, and those who reported that they did not were given a score of 0. I conducted several diagnostic tests prior to estimating the equations; these included an examination of multicollinearity and residuals.

This dissertation includes four hypotheses, which use parents' income as an independent variable. However, the dataset is missing almost 25 percent of the values on income. There is also a large amount of missing data on parents' education because not all parents participated in the study. This is a major problem for this analysis because the social characteristics hypothesis especially depends on these variables. These variables are also very important for the other hypotheses because these variables capture an important aspect of social inequality. In this dissertation I impute parents' education, household income, reports of ability to pay bills, religion and religiosity with multiple imputation. I compared these results with the listwise deletion results.

In the next section I review some of the most commonly used methods for handling missing data as well as their problems.

## **Missing Data**

There are many techniques that may be used to handle missing data; some techniques are clearly problematic, while others, such as multiple imputation, are highly recommended (Allison 2001; Enders 2010; Treiman 2009). In fact some consider multiple imputation to be "the gold standard" for handling missing data (Treiman 2009). In this section I review the most widely used methods to handle missing data. I have divided them into three categories: traditional methods, proxies, and newer methods.

In order to understand the methods for handling missing data, one must first understand the mechanisms of missing data. In 1976, Donald Rubin introduced the three mechanisms of missing data that are still used today, namely, missing completely at

random (MCAR), missing at random (MAR), and missing not at random (MNAR) (Rubin 1976). Let us review these three very important mechanisms.

First, missing data are said to be MCAR when the probability of the missing data does not depend on the variable itself or on any of the other independent variables. If this condition is met for all the variables with missing values, the data are considered to be a subsample of the original sample (Allison 2001).

The second missing data mechanism is known as MAR. Data are considered to be MAR if the probability of the missing data does not depend on the values of variables with the missing data, after controlling for other variables in the model. However, the probability of missing data can be related to the other variables in the model (Acock 2005; Allison 2001; Enders 2010). For example, given a data set with the three variables of age, marital status and income with missing values, the data would be considered MAR if the probability that income is missing is related to age and/or to marital status, but the probability that income is missing does not depend on whether a person has low or high income. Since the missing values depend on the values of the unobserved data, there is no acceptable method for determining if the data are actually MAR. Nonetheless, techniques like multiple imputation assume that the data are MAR (Allison 2001; Enders 2010).

The third mechanism proposed by Rubin is MNAR. The data are considered MNAR when the MAR assumption is violated. In other words, the probability of missing data depends on the variable with missing data; and as is the case for MAR data, there is no method to assess if the mechanism is in fact MNAR.

Another technical term important in understanding missing data is the distinction between “missing information” and “missing data.” “*Data*” refers to the actual facts that are collected to provide the information about the research questions. For example, data are collected on drinking behavior to provide *information* about patterns of missing behavior in the group of interest. This distinction is important because a data set can have a lot of missing data but no missing information. A good example for showing this distinction is MCAR data. A data set that is MCAR can have a lot of missing data but it has no missing information (McKnight et al. 2007). On the other hand, if the data are MNAR, even a small amount of missing data can have a lot of missing information.

Having discussed some of the terms and concepts, I next turn to brief descriptions of the most popular methods of handling missing data, including the two methods that are used in this dissertation, as well as several others.

### **Listwise Deletion**

Listwise deletion, also known as case deletion, drops the missing values from the data set and analyzes the reduced sample. If the data are MCAR, this sample is considered an unbiased subsample of the original dataset (Allison 2001). Consequently, it can produce unbiased estimates, and the standard errors are considered appropriate. But in general, the standard errors will be slightly larger than if the original sample was used since the sample size is now, smaller. The standard errors will also tend to be larger than those that would be obtained with other methods such as multiple imputation, but there is no concern about making inferential errors if the data are MCAR (Allison 2001).

With larger standard errors, power is reduced and the probability of finding significant results is decreased; thus this method is often viewed as conservative provided that the MCAR assumption is met (Acock 2005).

If the data are MAR and listwise deletion is used, the estimates can be biased (Allison 2001). But Allison (2001) points out that while listwise deletion is not robust to the MCAR violation, it is robust to the violation of MAR in regression analyses provided that the probability of the missing data does not depend on the dependent variable and that all the assumptions are met (Allison 2001). For example, let us assume that a researcher wants to predict the level of depression of a person using three independent variables: income, gender and marital disruption. Let us assume that 20 percent of the income data is missing, and the probability of these missing data indeed depends on income. Listwise deletion is robust to the MAR violation as long as the probability of missing income does not depend on the dependent variable, level of depression. In other words, listwise deletion can work well with MNAR data in regression analyses, as long as the probability of missingness does not depend on the dependent variable.

Allison explains that listwise deletion is robust to this violation because it is essentially equivalent to stratified sampling which does not produce biased estimates in regression models (Allison 2001). He adds that with regard to logistic regression, listwise deletion yields appropriate inferences even when the probability of missing data depends on the dependent variable but not on any of the independent variables and all the assumptions are met. In other words, for logistic regression, listwise deletion can work when the MAR assumption is violated with respect to the dependent variable or to

the independent variable, but not to both (Allison 2001). Allison (2001) also notes “listwise deletion is not a *bad* method for handling missing data [when the data are MCAR in regression analysis. And] ....whenever the probability of missing data on a particular independent variable depends on the value of that variable (and not the dependent variable), listwise deletion may do better than maximum likelihood or multiple imputation” (Allison 2001:7). He also adds that this method is simple and can be applied to most types of statistical analyses.

However, not all researchers share the above conclusion. To illustrate, Enders recommends this method “only if the proportion of missing data is trivially small” (2010:55). However, he offers no guidelines as to what one should consider “trivially small.” Treiman explains that listwise deletion is appropriate only “when the model is perfectly specified and the value of the dependent variable is not affected by the missingness of data on any of the independent variables” (2009:183). He adds that since “perfectly specified models are virtually unknown in social science” the use of this method “requires a judgment on the part of the analyst” (Treiman 2009:183-184). Others argue that listwise deletion “can perform less well” than the general literature suggests (Paul et al. 2008:351). In sum, this technique is very easy to use, and most software packages use this method as the default mode for handling missing data; yet, there is still no consensus or clear guidelines about when it can or should be used.

There are several methods I will review in this section that pertain mainly to recovering or replacing the missing data.

**Pairwise Deletion**

Pairwise deletion, also known as available case method or case analysis, uses all the available information to compute summary statistics (e.g., sample means, covariance matrix, standard deviations and correlation matrix) for each variable. This information is then used to estimate the parameters (Acock 2005; Allison 2001; Enders 2010).

Allison states that this method produces “approximately unbiased [estimates] in large samples” when the data are MCAR, but when the data are MAR the estimates “may be seriously biased” (Allison 2001:8). Moreover, Acock explains that given that there might be different sample sizes, in some cases the correlation matrix is impossible to invert, and most important, there is no rule to decide on the number of degrees of freedom. This method is generally not preferred over listwise deletion (Acock 2005; Allison 2001).

**Mean Substitution**

Mean substitution is very simple; the missing values are replaced with the mean of the sample. However, it is argued that the use of this method is often inappropriate because subjects who do not answer questions often tend to be at the extremes of the distribution (Acock 2005; Enders 2010). Mean substitution is also problematic when the percentage of missing values is large because this will greatly reduce the variance and therefore underestimate the correlation between the variable with missing values and any of the other variables in the model (Acock 2005; Allison 2001; Enders 2010)).



Mean substitution is sometimes calculated using data from subgroups. For example, the researcher might estimate the income of females and the income of males and then substitute the missing values for income in the dataset with the sex-specific mean values. Although this method will reduce the variance, it is considered only slightly better than substituting with the overall mean (Acock 2005). However, Enders (2010:43) explains “...simulation studies suggest that mean imputation is possibly the worst missing data handling method available. Consequently, in no situation is mean imputation defensible, and you should absolutely avoid this approach.”

### **Hot Deck and Cold Deck Imputation**

Hot deck imputation may be done in many different ways, but in general the missing values are replaced with random values found in the observed data. In some cases the value is randomly selected only from data deemed to be relevant to the missing value. For example, if the researcher believes that being a bachelor is related to the missing data, the value would be selected only from those subjects who were single. Another type of hot deck imputation involves substituting the value according to the “closest” values in the dataset. To be more specific, if a value for Subject Number 200 is missing, the value is replaced with the value for Subject Number 199 or Subject Number 201 (McKnight et al. 2007). As with the methods mentioned above, replacing values with existing values from the data set reduces the variance that, in turn, produces smaller standard errors and increases the probability of making Type I errors.

Cold deck imputation attempts to avoid the above problem by replacing values with those from another data set. Alternatively, when there is no other dataset available, the original data set is split into two and the values in one half are used to replace the missing values in the other half, and vice versa. Unfortunately, this method still produces biased estimates. Allison notes that “analyzing imputed data as though they were complete data produces standard errors that are underestimated and test statistics that are overestimated. The conventional analytic methods simply do not adjust for the fact that the imputation process involves uncertainty about the missing values” (Allison 2001:12).

### **Proxies**

Another method that researchers commonly use to handle missing data is the use of proxies. This method is not usually discussed in the missing data literature; however, its application is endemic. In the Add Health dataset, mother’s education is the most common proxy for parents’ social characteristics (Casares et al. 2010; Francis 2010; Okunade 2009; Vaquera 2006). However its validity is rarely questioned. For example, Perreira and colleagues used parents’ education as a measure of the parents’ socioeconomic status, instead of income. In a footnote they explained that “Income is highly correlated with parents’ educational status and, due to increased measurement error, provides a weaker measure of socioeconomic status. Therefore, it is not included in our analysis” (2007:29). However, the authors do not provide the source and magnitude of this correlation. In addition, the Add Health data has two sources of

information for parents' education: 1) the mother or primary care taker and 2) the adolescents who responded to this question in the school interview. Yet, the reader does not know which source they used and if the measurement error of the sources has been evaluated. In other words, the use of proxies is quite popular and very prevalent in the literature, but its validity is not always established.

This section reviewed what are known as the “traditional” methods of handling missing data. With the exception of listwise deletion, these methods are all problematic because they can produce biased estimates and inefficient standard errors. Multiple imputation and maximum likelihood estimation are therefore considered the next best alternative. In the following section I will only review the key concepts of multiple imputation because this is the method that will be used in this dissertation.

### **Multiple Imputation**

Multiple imputation (MI) has been in existence since the early 1970's (Rubin 1987), but it was not until quite recently that software packages, such as Stata version 11 included algorithm routines for its implementation. MI is a more complex and sophisticated method than the ones reviewed above. In general MI is the preferred method for handling missing data because as Allison (2001:27) explains, “when used correctly, (MI) produces estimates that are consistent, asymptotically efficient and asymptotically normal when the data are MAR.” Yet, MI has some limitations, which I will review in this section (Allison 2001; Horton and Lipsitz 2001; White, Wood and Royston 2007).

Multiple imputation is not concerned with recovering the missing data like the traditional methods mentioned above. Rather, it is concerned with estimating the population variance so as to produce generalizeable estimates (Acock 2005; Allison 2001; Enders 2010; McKnight et al. 2007; Rubin 1987). What is unique about this method is that it does not treat the data as if “they were real” (Allison 2001:29). MI estimates the values by taking into account the *uncertainty* of the missing values component. The MI method recognizes that even if the missing values are imputed, there is still uncertainty in those values; therefore, it adjusts the variance to take this into account. MI has three steps, imputation, analysis, and the combination of datasets. The imputation stage creates several data sets; the analysis stage runs the desired analysis in each data set; and the combination stage combines the imputations using the rules, which its creator, Donald Rubin, developed. The imputation stage can use auxiliary variables to impute the missing values. These variables should be related to the missing values. In addition, the imputation stage needs to have the same structure and variables of the analysis. In other words, it needs to include all the variables in the model and interactions or weights if they are to be part of the analysis. MI calculates the variance within and between the datasets and uses this to adjust the parameter estimates and produce more accurate estimates than if the data were treated as if they were “real” (Acock 2005; Allison 2001). Moreover, MI modeling assumes that the data are MAR; however, violations of this assumption has negligible effects (Schafer 1999; Schafer and Graham 2002).

Multiple imputation is especially attractive because it can be used with most statistical models. Nonetheless, it is worth noting that it has some disadvantages. First, since the MI method creates the datasets from a random draw, one will get slightly different results every time the analysis is performed, unless the specific seed for the draw is specified and used each time. In other words, it is possible for the same model to lead to different results if the process is done again with a different seed (Allison 2001).

Second, it is also possible to get somewhat different results depending on the number of imputations one chooses to implement (Allison 2001; StataCorp 2009). There is no set rule with regard to the number of imputations, but in general it is recommended that the minimum be no fewer than ten (Allison 2001; van Buuren 2007). In addition, it is advisable to run the model using different numbers of imputations (e.g., 20, 30, 40, 50 and so on), so as to make sure that the estimates remain stable (Allison 2001; StataCorp 2009). Further, it is recommended that the more missing *information* in the data, the more imputations one should execute (StataCorp 2009).

Third, there is the potential problem that the researcher is free to use his or her subjective judgment on which auxiliary variables to include in the imputation. Consequently, two researchers working with the same dataset and the same hypothesis could possibly produce somewhat different results depending on which extra variables they decided to include in the imputation.

This review of the literature on missing data demonstrates that there are a number of problems with using the traditional methods that focus on recovering the missing data,

primarily because these produce biased and inefficient estimates. Of all the most frequently used methods, listwise deletion appears to be the least problematic, provided that the data are MCAR or that the amount of missing data is negligible (Allison 2001; Enders 2010). However, it is the more recently developed method of multiple imputation that has become the most popular in recent years (Enders 2010; Kenward and Carpenter 2007; Treiman 2009; Twala 2009).

In this dissertation the variables of household income, parent's education, ability to pay bills, religion and religiosity will be imputed using multiple imputation. No auxiliary variables will be used in the imputations because the possible auxiliary variables themselves also have large amounts of missing data. Due to the above noted problems of multiple imputation, the results will also be compared with listwise deletion (Conde 2011).

In this section, I have described the data, the hypotheses and the methods that are used in this dissertation. In addition, I reviewed the main methods used to handle missing data, and I have explained the advantages and disadvantages of using multiple imputation. In the next chapter, I will present the results of my tests of the social characteristics and the cultural hypotheses, and in Chapter V I will present the results of the hypotheses concerning education.

## CHAPTER IV

### SOCIAL CHARACTERISTICS AND PREGNANCY VIEWS HYPOTHESES

In this chapter of my dissertation I present the results of the analyses that tested the social characteristics and the cultural values hypotheses. First, I will present the results of the social characteristics hypothesis. The results include a discussion of the descriptive statistics followed by the results of the logistic regressions analysis. In addition, I will interpret the results of the model that was estimated after addressing issues of missing data with multiple imputation. Second, I will present results of the cultural values hypothesis following the format of the first hypothesis.

#### **Social Characteristics Hypothesis**

The strong form of the social characteristics hypothesis expects that after controlling for income, education and occupation, the fertility differences between the minority and majority groups should disappear (Bean and Tienda 1987). In this chapter I compare the odds of having a teen birth for Mexican origin, African American and non-Hispanic White teens, using the latter as the reference group. This hypothesis will be supported if after controlling for income and education, the fertility differences between the minority groups and non-Hispanic Whites disappear. Although the focus of this dissertation is with Mexican origin teens, for this hypothesis I chose to include African Americans in the analysis to determine if the hypothesis is supported for this minority group. As it was discussed in the literature review, the differences in teen fertility for African Americans compared to non-Hispanic Whites are explained in terms

of social inequality. Yet, for Latinas the differences are explained in terms of cultural differences. Therefore, I am interested in finding out if the social characteristics hypothesis works differently for Mexican origin and African American teens.

### **Descriptive Statistics**

The descriptive statistics for the social characteristics hypothesis were calculated on the total sample used for the listwise deletion analysis. The results do not include the values of all the people who were eligible for the sample. Instead the results presented here include only the descriptive statistics of the people who were actually included in the listwise deletion analysis. The descriptive statistics of the multiple imputation analysis are not reported because, as already noted, the focus of multiple imputation is on parameter estimation rather than on descriptive statistics (Allison 2001; Enders 2010). Consequently, for some variables the values would not make sense in terms of descriptive statistics. For example, the dummy variables that were imputed will yield values out of the 1 and 0 range. For this reason the discussion of the descriptive statistics will only include those from the listwise deletion analysis.

Table 1 presents all the descriptive statistics of the variables used in the social characteristics hypothesis. The total sample included 4,974 participants. Seventy eight percent of the sample was non-Hispanic White, 16 percent was African American and six percent was of Mexican Origin. In terms of the dependent variable, one finds large differences between the minority and majority group. Out of the total sample, 14 percent of the research participants had a teen birth. However, as we already know from



my review of the literature, there are large differences between the different ethnic and racial groups. Twenty five percent of Mexican origin teens experienced a teen birth, compared to 24 percent for African Americans and 12 percent of non-Hispanic White adolescents. These numbers are consistent with the descriptive statistics presented earlier where it is shown that Mexican origin teens have a higher birth rate than African Americans and non-Hispanic Whites (Martin et al. 2010).

The total mean age was 15.74 and the other groups had similar values. The mean for non-Hispanic Whites was 15.70, for African Americans 15.96 and for Mexican origin teens 15.69. The mean for religious importance was 3.09. However, African Americans had the highest value. Their mean was 3.39 compared to 3.24 for Mexican origin, and 3.01 for non-Hispanic Whites. In terms of religion for African Americans 52 percent were Evangelical; 14 percent were Protestant; 13 percent were of other religion; 11 percent had no religion; 5 percent were Black protestant and the other 5 percent was Catholic. For Mexican origin teens, 63 percent were Catholic followed by 13 percent Evangelical, 10 percent Protestant, 7 percent of other religion and 6 percent had no religion. Twenty nine percent of Non-Hispanic Whites were Protestant, 25 percent were Catholic, 23 percent Evangelical, 12 had no religion and 10 percent had another religion. Black Protestants and Jews accounted for only one percent of the sample. However, the Jewish category was dropped from the analysis because it perfectly predicted a failure.

The values related to the social characteristics were very striking. The total mean salary for a non-Hispanic White family was \$46,420. dollars compared to \$28,340. for African Americans and \$29,480. for Mexican origin families. Moreover, 86 percent of

the White families reported that they had enough money to pay their bills. However, only 71 percent of African Americans and 74 of Mexican origin households had enough money to pay their bills. These values show very clearly that both African Americans and Mexican origin families have lower incomes and have more difficulties making ends meet. The educational differences were more salient for Mexican origin parents. The mean number of years of education for this group was 11.14, compared to 13.21 for African Americans and 13.77 for White parents. While African Americans had a value closer to Whites, it is worth noting that the Add Health data oversampled African American teens who had parents with a college degree.

### **Logistic Regression Results**

I first examined the tolerances for my independent variables. The tolerances for all the X variables in the models were above .4. The residuals were checked and it was found that the skewness and kurtosis were not within the acceptable values. Therefore, I analyzed the influential points and dropped these values from the models. I found that after I dropped the cases with influential values the effects did not change. Consequently, I present the results of the full model with the larger sample because there were no differences in inferences when using the large sample compared to using the reduced-size sample.

The results of all the models for the social characteristics hypotheses are presented in Table 2. The first model shows the effects of race and ethnicity on the odds of having a teen birth. The odds of having a teen birth are 151 percent higher for

Mexican origin teens compared to non-Hispanic Whites. For African Americans the odds are 142 percent higher than for Whites. The significance value for both groups is .01. In other words, the crude values for minorities are indeed higher than for Whites. When age is entered in the second model, the values for race and ethnicity remain significant at .01. However, age is not significant. The third model adds religious importance, which was measured using an ordinal scale, with one standing for not important at all and four for very important. In this model one finds that other things being equal, as religiosity increases by one point, the odds of having a teen pregnancy decrease by 15 percent. However, this variable is significant at the .05 level. In model four I added type of religion using Catholics as the reference group. I used Catholics as the reference group because as it was shown in the descriptive statistics that, two thirds of Mexican origin teens were Catholic. In this model, only Evangelicals and Black Protestants were significantly different from Catholics. In other words, after controlling for other variables in the model, the odds of having a teen birth for Evangelicals are 167 percent higher than for Catholics. This variable is significant at the .01 level. The odds for Black Protestants are more than 200 percent higher than for Catholics, and the variable is significant at the .05 level. It is worth noting that Mexican origin teens and African Americans remain significantly different from Whites. The former is more than three times as likely to have a teen birth than Whites, while for the latter, the odds are only twice as likely than for Whites.

However, when parental education is added to model five, the odds for Mexican origin teens are reduced by 100 percent. All the other variables except for Protestants

remain almost the same as in model four. In model five the Protestant variable becomes significant at the .05 level. This means that compared to Catholics, the odds of having a teen birth for Protestants are 50 percent higher. Moreover, after controlling for the other variables in the model, for every additional year in the parent's education, the odds of having a teen birth are reduced by 14 percent. This variable is significant at the .01 level. When household income is added in model six, the level of statistical significance of the effect for Mexican origin teens drops from .01 to .05. Household income is significant at the .01 level. This means that for every \$1,000 increase in household income, there was a 2 percent decrease in the odds of having a teen birth. All the effects of the other variables in this model were identical to those in the previous model. In model 7, I added a variable standing for whether or not parents were able to pay their bills. However, this variable made no difference in the model. All other variables were almost identical to the sixth model.

The last model was run using multiple imputation. A total of 55 imputations were used. In the listwise deletion model, the total sample included 4,974 participants, but in the logistic regression estimated with multiple imputation the sample increased to 6,895 adolescents. The multiple imputation model recovered almost 2,000 cases from the original sample, and this ended up making a difference in the findings. The full listwise deletion model yields a significance value of .05 for the odds of having a teen birth for Mexican origin teens compared to Whites, but the significance value for the multiple imputation (MI) model is .01. The significance for African Americans is the same as in the listwise deletion and the MI models. However, in the MI model age becomes

significant at the .10 level. The religious importance variable does not change in the MI model.

For people with no religion there is still no difference between them and Catholics. For Protestants the odds of having a teen birth remain 50 percent higher than for Catholics, and this difference is still significant at the .05 level. For Evangelicals the significance level is still at the .01 level. Evangelicals are one and a half times more likely to have a teen pregnancy than Catholics. For Black Protestants the odds compared to Catholics also do not change from the listwise deletion model to the MI model. However, people of other religions are different from Catholics in the MI model. In this model the odds of having a teen birth for people of other religions increase by 50 percent compared to Catholics. This is significant at the .05 level.

Compared to the listwise deletion model, one finds that the effects for age, and for people of other religions, change from nonsignificant to significant. Moreover, the variable for parents' ability to pay household bills changes from nonsignificant in the listwise deletion model to significant at the .10 level in the MI model. On the other hand, for parents' education and household income, the effect sizes and significance values do not change from the MI model to the listwise deletion model.

I urge the reader to interpret with caution the effects of the variables that change depending on the method that is used to handle the missing data (Conde 2011). I have argued previously that the effects that are consistent in the listwise and MI models can be accepted with more reassurance, but that the ones that change significantly should be treated as *potential effects*. That is, one cannot rule out the possibility that there might

be an effect for age and people of other religions; yet, the effect sizes and significance levels of these variables in the MI model should be treated with caution unless there is a strong theory to support the findings. In this case there is no strong theory to explain why people of other religions might be significantly different from Catholics. To confirm the effect of these variables in the MI model, one would need to replicate the analysis with a different dataset (Conde 2011).

In sum, the strong form of the social characteristics hypothesis is not fully supported for African Americans or for Mexican-origin teens. However, compared to the first model, which includes only the racial and ethnic variables, the odds of experiencing a teen birth are shown to decrease when parents' education and income are introduced. When parental education and household income are introduced in the model, the odds for Mexican origin adolescents are reduced by more than 45 percent compared to the first listwise deletion model. And the significance level changes from .01 to .05. In the MI model the odds are reduced by 40 percent, but the effects go back to a significance level of .01. For African Americans the effect size is reduced by 80 percent from the crude model to the final listwise deletion model and by 90 percent in the MI model. However, the significance level remains constant at .01. In other words, although the fertility differences between the minority group and Whites do not disappear, parental education and household income do have an effect on the odds of experiencing a teen birth. The effects of these variables are significant in both the listwise deletion models and the MI model. Moreover, these variables do reduce the fertility differences between the minority and majority group. These findings suggest that although household

income and parents' education do not fully explain the differences in fertility between the minority and the majority group, the social characteristics variables are important and should be taken in to account when trying to understand the teen fertility differences between Whites and minority groups.

Religious importance is another important variable in the model; however, this variable did not reduce the odds of any of the minority groups as much as did parental education and household income. If one looks at the regression results in model 2 and in model 3, one can see that when the importance of religion is introduced, the odds for African Americans increase from 2.45 to 2.62, and for Mexican origin adolescents the odds increase from 2.51 to 2.62. When type of religion is added in model 4, the odds for African Americans decrease by 57 percent, but for Mexican origin teens the odds increase by 65 percent. The only factors that actually reduce the effect size of the race and ethnicity variable are parents' education and household income. These results also suggest that there are other factors, besides religion and social characteristics that contribute to racial and ethnic teen fertility differences. For African Americans the differences have been explained in terms of social inequality (Furstenberg 2007; Geronimus 1986; Geronimus 1992). However, for Latinas, and more specifically, for Mexican origin women, this residual has been explained in terms of cultural differences (Bean and Tienda 1987). In the following section I examine whether social characteristics have an effect on the values that are usually attributed to cultural differences.

### **Pregnancy Views Hypothesis**

Since the social characteristics hypothesis failed to explain fully the fertility differences between Mexican origin and White teens, some sociologists have argued that the remaining differences should be explained in terms of cultural values (Bean and Tienda 1987). Although some have criticized the cultural explanation because it is usually treated as a residual and this is not tested directly (Fischer and Marcum 1984; Lopez and Sabagh 1978), many attempts to evaluate the effect of culture remain circular because they do so without a theoretical framework that can explain what culture is and how it affects fertility behavior. Instead many researchers test “cultural differences” under the assumption that Spanish spoken at home, listening to music or radio in Spanish, and having Chicano friends have an effect on fertility because they reinforce the Mexican pronatalist values (Fischer and Marcum 1984; Lopez and Sabagh 1978). However, there is no theory, or empirical evidence, to suggest or support the idea that these types of activities actually make women want to have more children. Most important, these types of measures do not and cannot make a distinction between the so-called cultural values and symptoms of marginalization. For example, if having more Latino friends is interpreted as having more Mexican cultural values, this ignores the possible effect of social inequality, which in this case is the possibility that Mexican teens have more Latino friends because White adolescents discriminate against them. In other words, using proxies for the concept of culture, without having a theoretical framework, cannot show whether these activities are reinforcing “cultural values” or whether they are symptoms of continuous marginalization.



Others have argued that Latinas' pronatalist views become evident in the declaration of many adolescent Latinas that there is nothing wrong with having a teen pregnancy (Ryan et al. 2005). This argument, however, has been made on the basis of descriptive statistics. Instead, I will use this kind of statement as a variable and use it to test if these views are related to social characteristics. In this analysis I test if after controlling for social characteristics, Mexican origin teens are still more likely than Whites to report that a teen pregnancy is not a bad thing. Finding a significant difference between Whites and Mexican origin teens would seem to suggest that pronatalist views might be responsible for some of the fertility differences.

### **Descriptive Statistics**

The descriptive statistics for the variables in this hypothesis are found in Table 3. The total sample for the listwise deletion analysis included 2,639 adolescents. In this sample, 93 percent of the participants were non-Hispanic Whites and 7 percent were of Mexican origin. The mean age was similar for both groups. Mexican origin teens had an average of 16.86 and Whites 16.83. For Mexican origin teens' religion was more important with a value of 3.29 compared to 2.90 for Non-Hispanic Whites. In terms of the type of religion, for Mexican origin teens, 7 percent had no religion; 10 percent were Protestant; another 10 percent were Evangelical; 7 percent had a different religion and 66 percent were Catholic. For non-Hispanic Whites, 14 percent of the sample had no religion; 25 percent were Protestant; 23 percent were Evangelical; 1 percent was Black Protestant; 11 percent were of a different religion and 25 percent were Catholic. As in

the previous hypothesis, the differences in the social characteristics were very dramatic. The mean income for a White family was \$47,560 compared \$25,080 for the Mexican origin households. In terms of parents' years of education, Mexican origin parents had a mean of 10.69 years, while non-Hispanic White parents had an average of 13.72 years of education. Last, 85 percent of the White families reported that they had enough money to pay their bills, but only 68 percent of the Mexican origin families had enough money to pay for their expenses. In sum, the descriptive statistics show that Mexican origin teens are more likely to report that it is "not so bad" to have a teen pregnancy, but when one looks at the mean values for the social characteristics variables, the Mexican origin households have substantially lower incomes, more difficulties paying for their living expenses, and their level of education is about 3 years lower than that of the White parents.

### **Logistic Regression Results**

The results for the pregnancy views hypothesis are presented in Table 4. The first model shows that Mexican origin teens, compared to non-Hispanic Whites, are indeed more likely to report that it is not so bad to have a teen pregnancy. The difference is significant at the .05 level. The second model adds age, and this variable is significant at the .01 level. This means that a one-year increase in age increases the odds by 38 percent that an adolescent in the sample will report that having a teen pregnancy is not a bad thing. The effect of ethnic origin does not change when age is added to the second model. When the variable for the importance of religion is included in the model, the

effects of ethnicity and age do not change, but religious importance is not significant. Model 4 shows that when the type of religion variable is added to the model, the odds of reporting the pronatalist views increase for Mexican origin teens. They change from 2.36 to 2.62, and the significance changes from the .05 level to .01. However, when parents' education is introduced in model five, the magnitude of the ethnicity variable is nonsignificant. Age remains significant at .01, and parents' education is significant at the .05 level. In other words, after controlling for the other variables in the model, for every year increase in the parents' education, the odds of reporting that a teen pregnancy is not so bad, decrease by 10 percent. Yet, when household income is added to the sixth model, income has an effect at the .01 level and the effect of parents' education becomes nonsignificant. Moreover, the effect of ethnicity remains non-significant. The only other variable in the model that is significant is age. When the variable for the ability to pay bills is included in the model, the effect of income changes from .01 to .05, but the effects of all the other variables in the model except for age are not significant.

The last model presents the results of the multiple imputation analysis. The results for this model are identical to the final listwise deletion model. The results do not change even though almost 2,300 cases have been added to the model.

The results suggest that although Mexican origin teens are more likely to report values that are usually associated with pronatalist views, the results suggest that differences are not due to characteristics of the ethnic group. Instead these differences seem to be related to economic factors. The results are very solid because even after the data were imputed, the results did not change.

## Conclusion

The purpose of this chapter was to first test the social characteristics hypothesis with respect to the odds of having a teen birth. The results show that although the differences between the minority and the majority group do not disappear after controlling for social characteristics, parents' education and household income do indeed reduce the differences between minorities and non-Hispanic Whites. Another important finding in this analysis was that although religiosity and Catholicism are considered to be characteristics that can explain racial and ethnic differences, the effect of these variables on the race and ethnicity variable did not change significantly. This suggests that although these variables have an effect on predicting the odds of having a teen birth, they do not have much of an effect on explaining ethnic and racial differences.

The second hypothesis attempted to separate the effects of a view that is usually attributed to the "Mexican culture" from the effects of socioeconomic factors. The results suggest that the differences in reporting views about teen pregnancy are the result of socioeconomic rather than "cultural" differences. These results also demonstrate the importance of not making hasty conclusions based on descriptive statistics.

But most importantly, the results of this chapter show that socioeconomic resources are critical in understanding fertility differences. While the differences are not fully explained by the social characteristics hypothesis, in a like manner the differences are also not fully explained either by pronatalist views or religiosity or type of religion.

In this analysis I steered away from testing the effect of cultural characteristics in terms of nativity, language, residential segregation or stereotypical behavior. I argue

that none of these variables actually explain why Mexican origin teens have higher teen fertility rates. All these measures assume that fertility differences are the products of what I would call a *ghost cultural effect*, which are mechanisms that cannot be defined or measured directly. Testing hypotheses using these assumptions is dangerous because they can obscure the effects of factors that are related to marginalization and social inequalities. For this reason, I contend that to make progress in understanding the teen fertility difference between Latinas and non-Hispanic Whites, researchers need to better identify factors that might be directly related to the social inequality factors that Latinas experience (i.e., immigration policies, educational opportunities, discrimination in education and employment).

In an attempt to explore the effects of some of these factors, in the following chapter I examine the effect of educational aspirations and experiences on the odds of predicting a teen birth (Rindfuss et al. 1980).

## CHAPTER V

### EDUCATION AND TEEN FERTILITY

In this chapter I analyze the relationship between education and teen fertility. Rindfuss and colleagues have explained that the “possible causal connection between education and fertility is exceedingly complex” (1980:432).” This relationship can have bidirectional effects because education can affect the timing of the first birth, and the first birth can have an effect on educational attainment (Marini 1984; Rindfuss et al. 1980). This relationship is even more intricate when studying teen fertility because the effect of education is in constant flux due to developmental changes and/or educational experiences. In this chapter of my dissertation I present the results of my attempts to explore this complex relationship focusing on the fertility of Mexican origin teens.

First I report the results of the hypothesis that examines the effect of educational experiences and aspirations on teen fertility. Second, I report the results of the hypothesis that examines the relationship in the opposite direction. More specifically, I analyze the effect of teen motherhood on educational attainment. The results include an explanation of the descriptive statistics followed by the results of the statistical analysis. The results of the latter will be presented using two methods of handling missing data, namely listwise deletion and multiple imputation.

### **Educational Aspirations and Experiences Hypothesis**

The first hypothesis I will test in this chapter assumes that early fertility is influenced by educational experiences and aspirations. This hypothesis can be understood from two different perspectives. One perspective explains that educational experiences and achievement mold educational and career goals. The second is closely related to the cost-benefit perspective, which argues that career and educational aspirations are shaped by the foreseen benefits (Rindfuss et al. 1980). Since this analysis is exploratory, I do not attempt to argue for one perspective or another. Instead, I am just interested in testing if educational experiences and aspirations have an effect on adolescent fertility. Under this hypothesis one should find that as educational aspirations increase, the odds of having a teen birth are reduced. Moreover, this hypothesis will be supported if negative educational experiences are shown to increase the risk of having a teen birth. For this hypothesis I control for age, social characteristics, religion, and religiosity. First I present the results of the effects on both non-Hispanic Whites and Mexican-origin teens, and second I report the results of the effects on only the Mexican origin adolescents.

### **Descriptive Statistics**

Table 5 presents the results of the descriptive statistics. Ten percent of the total sample had a teen birth. However, the percentage for Mexican origin teens with a teen birth is double that of the overall mean at 25 percent. For non-Hispanic Whites, only 12 percent had a teen birth. In terms of age, both Mexican origin teens and non-Hispanic

Whites were on average 15.7 years old. The mean of religious importance for the total sample was 3.03, but the mean for Mexican origin teens was higher than for Whites. The former had a mean of 3.24, and the latter a mean of 3.00. With regards to the type of religion, there were large differences between the two ethnic groups. For Mexican origin teens, 63 percent of the sample was Catholic, 13 percent was Evangelical, 10 percent was Protestant, seven percent had no religion, and six percent had another religion. For non-Hispanic Whites, only 25 percent of the sample was Catholic, 28 percent was Protestant, 23 percent was Evangelical, 12 had no religion, 10 percent were of another religion, and one percent was Black Protestant.

There were dramatic differences in the social characteristics variables. The mean salary for the total sample was \$45,530. However, the mean for Mexican origin teens was \$29,500. compared to 46,834. for non- Hispanic Whites. Moreover, 85 percent of the White families reported that they were able to pay their bills, but only 75 percent of the Mexican origin families were able to do so. The differences in parental education were also very striking. The mean number of years of education for Non-Hispanic Whites was 13.75, while for Mexican origin teens it was only 11.15. The educational variables for the adolescents of the two groups mirror those of their parents. In wave one, 21 percent of the Mexican origin teens had been held back a grade compared to only 13 percent of the non-Hispanic Whites. The educational aspirations were also higher among the non-Hispanic Whites. The mean value for Whites was 4.30 compared to 3.95 for Mexican origin teens. But perhaps the most dramatic differences were found in educational attainment. In wave four when the adolescents were 24-32 years old, 82



percent of the White participants had completed a college degree. However, only 62 percent of the Mexican origin teens had been able to finish college.

The descriptive statistics indeed show that Mexican origin adolescents have higher birth rates than Whites. However, this group is clearly at a greater disadvantage compared to Whites in terms of social characteristics. Mexican origin teens live in households with incomes almost half those of the White teens. Moreover, a quarter of the Mexican origin families are not able to pay their bills compared to only 15 percent in the White households. In terms of educational variables for the adolescents and their parents, Whites have more advantages. White adolescents have parents with higher education, and they also have higher educational aspirations and are more likely to graduate from college than are Mexican origin teens.

### **Logistic Regression Results**

The results of the educational aspirations and experiences hypothesis for the entire sample are presented in Table 6. The results of the analysis that excluded the adolescents who had had a pregnancy prior to the first interview are reported in Table 7. The tolerances of all the independent variables in the models were within the acceptable values. But the residuals of the models were outside the acceptable ranges; however, the regressions were analyzed with and without the influential points, and, as I found in earlier analyses, this made little or no difference on the results. Therefore, the models presented here are based on the entire sample.

Nine models were estimated. The first eight models handled missing data using listwise deletion. The last model used multiple imputation to handle the missing data for household income, parents' education, ability to pay bills, religion and religiosity. The total sample of the listwise deletion models numbered 3,797 participants. The multiple imputation model increased the sample size to 5,084.

The first column in Table 6 shows the effects of educational aspirations and negative schools experiences on the odds of having a teen birth. More specifically for every category increase in the perception that the adolescent will go to college, the odds of having a teen birth are reduced by 25 percent. On the other hand, negative school experiences, such as being held back a year compared to those who had never repeated a grade, increase the odds of having a teen birth by 88 percent. When the ethnicity variable is added in model two, I found that the Mexican origin teens are 125 percent more likely to have a teen birth than Non-Hispanic Whites. The regression results in model three show that age at wave one has no effect on the odds of experiencing a teen birth. However in model four, where religiosity is entered into the equation, the effect of age becomes significant at the .10 level. Moreover, in this model religiosity shows an effect on teen motherhood. For every category increase in the importance of religion, the odds of having a teen birth are reduced by 14 percent controlling for the other variables in the model. The effects of the education variables, ethnicity and age, are similar as in the previous models.

The effect of religion seems to have very little effect on predicting the odds of experiencing a teen birth if one controls for educational variables, ethnicity, age and

religiosity. The only religious affiliation that appears to have an effect on the odds of having a teen birth is the Evangelical religion. Evangelicals are 155 percent more likely to experience a teen birth than Catholics when controlling for the other variables, as in model five. Models six, seven and eight show the effects of adding the social characteristics variables. Model eight is the full model with the final full sample. In this model, parental education and household income are significant at the .05 and .01 level, respectively. Other things being equal, parents' education reduces the odds of having a teen birth by seven percent. Moreover, every thousand dollars increase in household income decreases the odds of having a teen birth by one percent. This is true when one controls for the educational factors, ethnicity, age and religiosity, religion, parents' education and the ability to pay household bills.

The multiple imputation model shows similar results despite the fact that the MI model recovered almost 1,300 cases. Compared to the results in the eighth model, the coefficients in the last column in the MI model show that the effects of the education variables become more significant. In the eighth model the effect of education aspirations reduces the odds of having a teen birth by 15 percent, and this is significant at the .05 level. However, in the MI model the effect increases to 17 percent, and the significance values changes to .01. The effect of negative educational experiences on education is similar. In the eighth model, the students who have been held back a year are almost fifty percent more likely to have a teen birth than are students who have not repeated a grade. Controlling for other variables in the model, the effect is significant at the .10 level. However, in the MI model the effect becomes significant at the .05 level.

In sum, the results of this analysis suggest that negative educational experiences tend to increase the odds of having a teen birth. The results also show that as educational aspirations increase, the odds of becoming a teen mother decrease. However, this analysis shows the results of the sample that included all adolescents who had had a teen birth. Table 7 presents the results of the analysis that excluded adolescents who had had a teen pregnancy by the time they were interviewed in wave one. I took this approach because one could well argue that a prior teen pregnancy could have influenced the adolescents' reports on educational aspirations. To come closer to a research design that can establish a causal relationship between educational aspirations and teen fertility, the independent variable needs to have occurred before the outcome. The results in Table 7 show that when the sample excludes adolescents who already had a teen pregnancy, the effects of educational aspirations become nonsignificant. Being held back a year in school is barely significant at the .10 level. The only variables that remain consistently significant across the models are religiosity, parents' education and household income.

Nonetheless, I argue that the complexity of the relationship between educational experiences and fertility should be examined before concluding that there is no relationship between the education variables and fertility. First, the sample excluded adolescents who had had a teen pregnancy rather than those who had in fact become teen mothers. I made the decision to focus on pregnancy because the adolescents who were pregnant at the time of the first interview did not yet know the outcome of their pregnancy. In other words, had I excluded only teen mothers who reported the birth at wave four, I would have missed the cases of adolescents who were pregnant at the time

of the first interview and who gave reports on the assumption that they were going to have a child but that their pregnancy actually ended in a miscarriage, still birth or abortion. Therefore excluding teen mothers would have still been problematic.

Second, educational aspirations are unlikely to remain consistent through the years. Even though the reports were made prior to the pregnancy, one cannot assume that those aspirations remained consistent throughout the teen years. Both educational aspirations and negative educational experiences are not like the other variables in the model that are more likely to remain stable. For example, the parent's education and income, religion and religiosity are less likely to fluctuate as much as the education variables. Many variables can affect the education variables used here. The educational aspirations can change as the adolescents grow older. Their aspirations can be influenced by many factors including academic achievement and financial and social support.

Another factor that should be taken into account when interpreting the above results is that I used repeating a grade held back variable as a proxy for negative educational experiences. However, this variable can also change throughout the teenage years. Some adolescents who had not been held back a year could have experienced this event between the first and the last waves. Furthermore, this variable does not capture other more complex experiences such as not having support in the school system.

I used these variables here because they were the only variables that were available in this dataset. But most important, one cannot straightforwardly measure the

fluctuations of educational aspirations, especially in adolescents. Adolescents are likely to report one event one day and another the next day. My decision to include reports of repeating a grade in the analysis was based on the findings of Romo and Falbo (1996) who found that students who had been held back a year were more likely to become discouraged with school and not graduate from high school.

In Table 8, I present the results of the regression models that only included Mexican origin adolescents. This analysis includes all the adolescents because the results in the models that excluded adolescents who had had a teen pregnancy at the time of the first interview were virtually identical to those of the full sample. The listwise deletion models showed no effect at all for Mexican origin teens. In other words, the analysis found no relationship between the educational variables and the odds of having a teen birth. Moreover, none of the other variables in the model showed any effects either. In this model I added nativity and language spoken at home, but these variables had no effects on teen fertility. The results in the multiple imputation model; however, shows that other things being equal, an increase in the educational categories can reduce the odds of having a teen birth by 27 percent. It is interesting that this was the only variable in the model that had an effect. Compared to the listwise deletion sample, the MI model had 237 more cases. The sample size could well have increased the power, so that in this model the effect was detected. However, these findings should be interpreted with caution.

For Mexican origin teens, the results in Table 8 show that religion, religiosity and the social characteristics variables do not have significant effects on the outcome. One

possibility is that these factors indeed do not have any effects on predicting the odds of experiencing a teen birth. Under this assumption future research needs to explore why the effects of these variables are so clear when Whites are included in the sample. From a theoretical point of view, one would have to develop a hypothesis that can address the social factors that mediate the effect of religiosity, religion and social characteristics.

My current hypothesis is that the effects of these variables are being obscured by confounding variables that are endemic to Mexican origin teens. For example, for Latino families, household income does not have the same meaning as it does for White families. The salary that a White family reports is a salary that one can assume is used to support that household. However, for Mexican origin families the salary that is reported will likely be lower from what is actually reported because a portion of that salary is often sent back to Mexico in remittances. In addition, even if the salary is not shared with a family abroad, Latino families tend to be larger. As a consequence, the effect of income for Whites is not always the same as for Latinos because the average family size is larger. Yet, this relationship cannot be captured in the model because information on the number of people who share the household income is not available. Another factor that might be mediating these effects is parents' involvement in the school system. Latino families clearly have lower educational attainment and salaries compared to Whites. This factor might influence the degree of school involvement since Latino parents are more likely to work in jobs where they do not have flexible enough schedules to be able to attend school meetings. Moreover, language barriers might make

it more difficult for parents to help their children in the school system or with homework assignments.

From a methodological perspective, the effects of the social characteristics variables and religion might be suppressed because there is not enough variance. In other words, most Mexican origin teens are Catholic, and most Latino homes have low incomes; hence the variances in these two variables may be lower than among non-Mexican origin teens, thus reducing the ability of these variables to have significant effects on the outcome. In short, I want to highlight the fact that there are multiple social and structural reasons for which the statistical effects of the variables might not be readily apparent in the analysis and that these factors need not necessarily be related to “cultural” variables.

However, following the approach taken in prior studies I have reviewed in the current literature, my findings would have been interpreted by the default answer, that is, that the differences are the product of “cultural” values. However, I urge the reader to consider the social, political and structural factors that might be suppressing the effects of the educational and social characteristics variables.

My analysis clearly has many limitations; therefore, I am reporting the results as an exploratory exercise. Despite the limitations, I still consider that my findings are important in understanding the relationship between teen fertility and educational experiences. First, I did find that educational aspirations and negative educational experiences do indeed have an effect on teen fertility. Although the effects were not found when the analysis was conducted without the adolescents who had had a



pregnancy before the first wave, my findings clearly show the potential of finding a clear relationship between educational experiences and aspirations and fertility. Moreover, there is a large body of literature that supports this relationship (Caldwell 1980a; London and Hadden 1989; Marini 1984; Rindfuss et al. 1980; Rindfuss et al. 1996; Upchurch, Lillard and Panis 2002). But most importantly, from a scientific perspective, the analysis failed to reject the null hypothesis that educational experiences and aspirations do not have an effect on fertility. Despite its limitations my results can be used to develop more hypotheses that can better explain the complex relationship between education and teen fertility.

In addition, my analysis shows the complexity of the relationship between education and teen fertility. Previous demographic models have focused on studying the relationship of women of all ages, but in this analysis I showed that focusing only on adolescents might be more complicated because the adolescents' responses and experiences are likely to fluctuate. And most important, my analysis attempts to highlight that the interpretations of statistical findings for Mexican origin teens need to be understood from the social and structural contexts that this population experiences. I turn next to the testing of the social inequalities hypothesis.

### **Social Inequalities Hypothesis**

Research on teen fertility among African Americans has found that preventing a teen birth does not always have much of an effect on improving future income and/or educational attainment (Furstenberg 2007; Geronimus 2003; Geronimus and Korenman

1993). However, the demographic literature shows that fertility does indeed affect educational attainment (Marini 1984; Rindfuss et al. 1980; Rindfuss et al. 1996). In this part of the chapter, I will examine and test the relationship between these two literatures. I am interested in determining if having a teen birth increases the odds of not graduating from college. But more specifically, I want to examine if the effect of having a teen birth is different for Mexican origin teens compared to non-Hispanic Whites. If having a teen birth has no effect on not graduating from college for Mexican origin teens, the results will support the findings of the social inequalities perspective that Furstenberg (2007) and Geronimus (2003) have addressed and upheld.

### **Logistic Regressions Results**

Table 9 shows the final results of this analysis, which was carried out in different stages. First, I examined the statistical tolerances and they were all within the acceptable range. The residuals were somewhat problematic, but the results did not change at all when the models were run without the influential data points. As a first step, I tested the effects of teen motherhood on the odds of not graduating from college among both White and Mexican origin teens. Since my research question focuses on assessing if teen motherhood has a different effect for Whites compared to Mexican origin teens on the odds of not graduating from college, I included an interaction term between ethnicity and teen motherhood. This interaction effect was not statistically significant. This means that there were no differences in terms of the effect of teen motherhood among White and Mexican origin teens with respect to the odds of not

graduating from college. However, to simplify the interpretation I also estimated the models separately for each ethnic group.

The first two columns of Table 9 show the results for the Non-Hispanic Whites. The first column shows the coefficients from the listwise deletion analysis. In this model, one finds that having a teen birth increases the odds of not graduating from college by 556 percent. This effect is significant at the .01 level. The second column shows the results of the MI model. In this model teen motherhood increases the odds of not graduating from college by 400 percent, and this effect is also significant at the .01 level. The effects of the other variables in the model are almost identical in the listwise deletion model and the MI model. The only variables that changed slightly were religious importance and age. In the listwise deletion model religiosity decreased the odds of not graduating from college by 14 percent and was significant at the .01 level. In the MI model the effect decreases the odds of not graduating from college by 16 percent and was significant at the .05 level. Age in the listwise deletion model had no effect, but in the MI model it became significant at the .01 level.

The third and fourth columns show the results for Mexican origin teens. The listwise deletion model shows that the odds of not graduating from college are 12 times higher for teen mothers than for adolescents who did not experience a teen birth. This effect is significant at the .01 level. In the MI model the odds of not graduating from college for teen mothers are five and a half times higher than for non-teen mothers, and the effect is also significant at the .01 level. The only other variables that had an effect

on not graduating from college were the educational aspirations and being held back a year in school.

In this analysis the effect of teen motherhood was no different for non-Hispanic Whites and Mexican origin teens. This was true for both the listwise deletion models and the MI models. This relationship was assessed through an interaction effect and using the test based on the work of Clifford Clogg (1995) to compare coefficients (Paternoster et al. 1998).

In sum, these results support the demographic literature showing that fertility affects educational attainment (Marini 1984; Rindfuss et al. 1980; Rindfuss et al. 1996). However, these findings do not support the work of Geronimus (1993) and Furstenberg (2007) who have argued that delaying a teen birth does not make a difference for minorities because they do not have the same educational opportunities of Whites. I have shown that having a teen birth has an equally negative effect on Whites and Mexican Origin adolescent females.

However, these results should also be interpreted with caution. To truly assess the causal effect of teen motherhood on educational attainment, one would have to conduct the analysis using an experimental design that can account for unobservable differences. Since this is not possible, the next best option is to control for the variables that are more likely to have had an effect on educational attainment, but the results should not be interpreted as solid evidence of causality.

## **Conclusion**

In this chapter, I analyzed the bidirectional effect of education on fertility. The results of the first analysis suggested that educational aspirations and negative educational experiences have an effect on teen fertility. However, because the findings have a number of limitations, the results should only be used to develop more refined hypotheses and to find variables that represent more accurately the effect of educational experiences and aspirations. Moreover, in this chapter, I also argued that the effect of education on teen fertility for Mexican origin teens needs to explore how structural factors can mediate the effect of the relationship. This analysis showed that teen motherhood invariably does hinder the chances that adolescents will graduate from college. The effect is the same for Whites and Mexican origin teens. However, since Mexican origin teens are already less likely to graduate from college and more likely to have a teen birth, the relationship between teen fertility and educational attainment becomes a greater problem for the Mexican origin population. Consequently, these findings are important for informing social policies that focus on the welfare of Latino youth.

In the next and final chapter of this dissertation, I will summarize my findings, draw out some of the implications of my research, and show where future research needs to be directed.

## CHAPTER VI

### CONCLUSION

In this dissertation I have examined the fertility of Mexican origin adolescents in the United States. My objective was to investigate the factors that might be contributing to the high fertility of Mexican origin teens compared to non-Hispanic White teens. In this chapter I summarize the main findings of each of my chapters. Then I review the limitations of my analysis and propose research questions and methodologies for future research. I conclude by reviewing the implications of my findings for social policies that focus on reducing teen fertility in the U.S.

#### **Summary**

Early in my dissertation, I reviewed the literature on adolescent fertility in the United States. I observed that the United States has the highest teen birth rate of any developed country in the world with 41 births per 1000 adolescents. The United Kingdom has the next highest rate, a teen birth rate of 26 births per 1000 females age 15-19 (United Nations, 2010). In these two countries teen motherhood has captured the public's attention because it is often associated with poverty and low educational attainment, which policy makers argue, have resulted in an enormous financial burden on the countries' economic systems. Both the United States and the United Kingdom have attempted to address the issue of teen fertility through programs that promote more sexual education for teens (Arai 2009). The United States has also implemented programs that endorse programs of abstinence from sexual activity. However, the

effectiveness of these approaches is questionable because there is no sound evidence showing that they actually work (Arai 2009; Furstenberg 2007).

Moreover, current research on teen fertility shows that high rates of teen fertility in developed countries are not necessarily the cause of other social problems such as poverty and low educational attainment. Instead, high rates of teen births are explained as a symptom of social inequality (Arai 2009; Furstenberg 2007; Geronimus 2001). More specifically, it is argued that minority adolescents do not become poor because they have a child; instead, they become teen mothers because they are poor and have few educational and career opportunities (Furstenberg 2007; Geronimus 2001; Luker 1996). This type of argument is based on research that focused on teen motherhood among African Americans.

In my review of the literature I found that while teen fertility among African Americans is explained in terms of social inequalities, for Latino adolescents the arguments often focus on acculturation and/or cultural differences (Biggs et al. 2010; Darabi 1986; Dehlendorf 2010; Dogan-Ates and Carrion-Basham 2007; Dore and Dumois 1990; Driscoll et al. 2001; Guilamo-Ramos et al. 2005; Jimenez and al 2002; Kaplan et al. 2003; Lee and Hahm 2010; McDonald et al. 2009; Upchurch et al. 1998; Yang and Gaydos 2010).

In response to this line of research, in my dissertation I have argued that examining teen fertility in terms of cultural differences and acculturation has theoretical and methodological flaws.

First I have observed that from a theoretical perspective the cultural explanation is problematic because the current literature does not define what culture is and how culturally ascribed behavior differs from behavior that is adopted and reinforced as a response to social policies and/or the social structure. Based on the work of Hunt and colleagues (2004), I endeavored to explain that the use of culture or acculturation in sociological research is problematic for at least four reasons: 1) There is no definition of culture, and more specifically, there is no theoretical or empirical evidence to guide researchers on how to distinguish a particular cultural group from another. 2) It is assumed that there are two distinct groups that can be identified. This assumption ignores that the cultural groups are not fixed objective categories, but, rather, are groups that have changed according to social and historical contexts. 3) It is assumed that there is a host and an immigrant culture. However, many groups like Mexican origin people have a long history and relationship with the United States. 4) The new and old cultural behaviors are never verified. Moreover, the acculturation perspective does not explain how cultures change and evolve throughout history (Hunt, Schneider and Comer 2004).

I have argued that the cultural explanation is an easy one, in that it absolves researchers from the need to investigate the more complex factors that influence the fertility of Latino teens. I also disputed the current approach for understanding fertility in terms of cultural differences on the grounds that the cultural explanations are often set forth empirically as a residual. In other words, when researchers have failed to explain fertility differences with socioeconomic and other characteristics, the cultural explanation becomes the wild card that fills in the voids that the data are incapable of



addressing. Moreover, I asserted that research that is based on identifying cultural differences is damaging to minorities because it ultimately ends up blaming Latinos for the high rates of teen fertility. But most important, research that focuses on cultural differences does not allow one to identify the social and political factors that perpetuate and contribute to the marginalization and oppression of Latinos.

In my review, I examined the attempts that have been made to reject the cultural explanation. Frank and Heuveline (2005) have argued that fertility differences between Mexican origin women and Whites are not necessarily based on cultural values because the fertility rates in Mexico are lower than the rates of Mexican origin women in the United States. In my analysis I pointed out that the authors are assuming that the fertility rate in Mexico is the standard and product of cultural values. However, I put forward the argument that low fertility rates in Mexico can also be understood as a response to social oppression and marginalization. Mexico undertook a very aggressive campaign to reduce fertility especially among the poor and low educated, which I argued, took away the reproductive freedom of many women. Moreover, there is demographic literature arguing that the fertility of indigenous women in Mexico might be declining because they are experiencing abject poverty (Vazquez Sandrin 2010). Finally I argued that it is inappropriate to compare the fertility rates between the U.S. and Mexico because each country has very different political, historical and social issues leading to unreasonable comparisons.

Other demographers have attempted to test the cultural explanation using measures of acculturation (Fischer and Marcum 1984; Lopez and Sabagh 1978). Their

measures include language spoken at home, watching television and radio shows in Spanish, and having Chicano or Mexican friends. I contended that these measures are inappropriate because they do not have a theoretical framework to explain how the behaviors being measured actually affect fertility. Again I argued that this type of research that uses invalid measures of culture is damaging to understanding fertility differences because they conceal the social factors that continue to marginalize minorities and prevent them from experiencing social mobility.

My review of the literature concluded with my proposing strategies for helping researchers better understand the factors that are contributing to high fertility rates among Mexican origin teens. I contended that research needs to focus on testing hypotheses instead of accepting residual explanations that have no scientific grounds. Therefore, I proposed to test four hypotheses. First, I tested the impact that social characteristics have on explaining fertility differences between Mexican origin teens and non-Hispanic Whites. Second, I ascertained whether reports of culturally ascribed values, such as “not viewing a teen pregnancy as a bad thing” are explained by socioeconomic factors. Third, I analyzed whether educational aspirations and negative school experiences have an effect on predicting teen births. Last, I examined the effect of having a teen birth on the odds of not graduating from college. In this analysis I focused on whether having a teen birth has the same effect for Mexican origin teens and as it does for White teens.

## Findings

The results of my first analysis showed that social characteristics, such as income and education, reduce the fertility differences between Mexican origin teens and Whites, but they fail to account for all the differences between these two groups. Moreover, I found that although high fertility rates among Latinas have been explained in terms of religion and religiosity (Bean and Tienda 1987; Forste and Tienda 1996), these two variables were not able to account for any of the ethnic difference between Mexican origin and White teens. Religiosity was shown to have an effect on predicting the odds of a teen birth, but it did not have an effect on reducing the fertility differences between the two groups. Moreover, Catholics were not more likely than people of any other religion to have a teen birth. This finding was important because most Mexican origin teens are Catholic and some researchers have argued that Catholics are prone to higher fertility rates (Bean and Tienda 1987).

In my second analysis I questioned the argument that Latinas have more children because they do not see teen pregnancy “as a bad thing” (Ryan et al. 2005). I found that Latinas are indeed more likely to report that having a teen pregnancy is “not a bad thing”; however, when one controls for income the differences between Mexican origin teens and Whites disappeared. In other words, my results showed that what are usually understood as cultural differences between Whites and Mexican origin teens are actually socioeconomic differences.

The results of these studies show the importance of socioeconomic factors in understanding teen fertility among Mexican origin teens. They also show the

importance of not making assumptions about cultural differences without taking into account the socioeconomic factors. But most important, the descriptive statistics showed that Mexican origin teens are at a disadvantage in terms of parents' education and income. I argued that these differences are a reflection of social inequalities that need to be addressed if we wish to reduce teen fertility among Mexican origin teens.

The other two hypotheses I tested explored the relationship between education and fertility. Demographic research has found that the relationship between education and fertility is complex and the effects are often bidirectional (Marini 1984; Rindfuss et al. 1980; Rindfuss et al. 1996). In my dissertation, I examined the relationship between education and fertility in two ways. First, I tested if educational aspirations and/or negative school experiences had an impact on predicting the odds of having a teen birth. Second, I tested if having a teen birth had an effect on not graduating from college.

The results of my first hypothesis had conflicting results. When I included all the adolescents in the sample, I found that both independent variables had an effect on predicting a teen birth. However, when I excluded adolescents who had already had a teen pregnancy at the time they were interviewed in wave one, the effect of educational aspirations disappeared. Being held back a year in school had only a marginal effect at the .10 level. Last, when I tested the effect on Mexican origin teens only, the effect of both variables disappeared in the listwise deletion model, but in the multiple imputation (MI) model, the variable tapping aspirations to go to college was significant at the .05 level.

This analysis has a number of limitations. First, the main independent variables, namely, educational aspirations and negative school experiences, could have changed through the teen years. As a consequence it is not possible to make a causal argument. Second, it is unclear about the magnitude in the second model of excluding the teens in the second model. On the one hand, I tried to control for reports that might have been shaped by a prior pregnancy, but in doing so I could have excluded a high-risk group who had early pregnancies. Regarding the Mexican origin sample, the results might be a reflection of methodological problems. First, it could be that the sample was too small to detect an effect, and this problem most likely was aggravated by the fact that in terms of income and religion there is not enough variance in the sample data. Despite this weakness, this analysis demonstrates the complex relationship between education and fertility in young people.

The last hypothesis examined the relationship between fertility and educational attainment. Prior research has shown that for minorities having a teen birth might not be as detrimental as for Whites because most minorities do not have the same educational opportunities of Whites (Geronimus 1997; Geronimus 2003). In my analysis I found that having a teen birth increases the odds of not graduating from college equally for Whites and Mexican origin teens. However, given that Latinas have lower incomes and less access to education, I argued that teen fertility is more damaging for this population. Geronimus (2003) has argued that having a teen birth for African Americans may be a reasonable option, given that this population does not have other opportunities.

While I agreed that minorities have fewer opportunities than Whites, I do not think that having a teen birth should be seen as a better option given the social circumstances. Instead I argued that researchers need to design studies that can help us address the social inequalities that continue the cycle of marginalizing minorities.

### **Strengths and Weaknesses of the Analysis**

In my dissertation I have attempted to address some of the gaps in the literature of adolescent fertility among Latinas. However, the analysis has its strengths and its weaknesses. I will review the strengths followed by the weaknesses. One of the strengths of this study is that the Add Health data allowed me to study Mexican-origin adolescents in a nationally representative sample. Previous studies have been conducted on convenience samples that in many cases include adolescents of Puerto Rican and Central American descent. Moreover, since these data was longitudinal, I was able to study teen fertility as a cohort. Other datasets that are commonly used to study fertility, such as the Current Population Survey (CPS), National Survey of Family Growth (NSFG), and the American Community Survey (ACS), have only cross sectional data. In addition, unlike previous studies that have explained fertility difference in terms of cultural differences, in this dissertation I tried to identify social factors that might be contributing to this disparity in fertility rates. I concluded that social characteristics do have an impact on fertility, and most important I explored the relationship between education and the fertility of Mexican origin teens.

Last, I used multiple imputation and listwise deletion to handle the large amount of missing data in the sample. These techniques allowed me to identify a potential effect that was not detected in the listwise deletion sample. That is, using multiple imputation, I found that aspirations to go to college might have an affect on fertility of Mexican origin teens, an effect that was not detected in the listwise deletion model. While this finding should be interpreted with caution, it is important to know that missing data might be suppressing the effects of some or all of the independent variables.

Nonetheless, the study also had a number of limitations. First, the sample was based on adolescents who were enrolled in school. This might be problematic because the data did not include adolescents who had dropped out of school. This is important because adolescents who drop out of school are a high-risk group for teen pregnancies. Second, the dependent variable had 271 missing cases because many women could not remember the date of their pregnancy. Missing values on the dependent variable cannot be imputed (Allison 2001). Last, the dataset does not have proper variables to test the challenges that minorities face in society and especially in the school system. For example, it would have been helpful to find out how many students received counseling to apply for college, learn about financial aid, or if they took classes to prepare for the Scholastic Achievement Test (SAT). These variables would have been better independent variables to use in assessing the relationship between educational barriers and teen fertility. This type of information would be preferred in a study of the relationship between fertility and education because it does not fluctuate like reports of negative experiences or educational aspirations. Thus, there is a need for databases that

will allow researchers the opportunity to explore more complex relationships between social inequalities and fertility.

### **Future Research**

This dissertation showed that the relationship between education and fertility is a very complex issue. For minorities, researchers still need to identify the barriers that minorities face in society and especially in the school system. I argued that qualitative research needs to be conducted to identify these factors. In particular, it is important to identify the issues that affect some Latino groups and not others. Second, there is a need to conduct more research that studies how social policies, such as not allowing undocumented youth to attend college, and various immigration policies impact the likelihood of teen fertility. Third, from a theoretical point of view it seems reasonable to try to merge the demographic fertility literature with the medical sociology literature on education. The demographic literature has a sound theoretical framework that links education with fertility in terms of costs and benefits. However, it is weak in explaining how schooling from a young age can influence fertility. The medical sociology work of Mirowsky and Ross (2003) has shown that education has an effect on health that is not based on economic gains. They have argued that education enables people to have more choices to live the lives people want to live (Mirowsky and Ross 2003a). I believe that this concept should be explored in terms of adolescent fertility because educational experiences and opportunities can work as an empowerment tool that allows adolescent females to make more choices about their lives and their fertility.



From a methodological perspective, to better understand the effect that education has on fertility, one needs to conduct multilevel analyses. These types of investigations would allow us to detect the effect of the educational and social context on fertility. Moreover, to study the effects of teen fertility on educational outcomes, one needs a research design that can account for some of the unobservable differences. One type of design would be to compare women who had a child with those who had a miscarriage (Hotz, McElroy and Sanders 2008). This is a natural experiment because a miscarriage is treated as a random event. While this kind of study surely has limitations, it is an appropriate way of analyzing the effects on adolescents of teen pregnancies (Hoffman 1998). Moreover, the models could be tested separating wanted and unwanted pregnancies. This type of analysis can be done with a dataset that has information on birth control use.

### **Policy Implications**

The main objective of my dissertation was to show that teen fertility differences between Mexican origin teens and Whites cannot, and should not, be explained in terms of cultural differences. I argued that this type of research blames the culture and the victim, and most important, it cannot guide social policies to address issues of social inequalities among minorities. Moreover, I have shown that social characteristics do have an impact on the fertility of Mexican origin teens. These findings support the arguments that teens who have a teen birth are adolescents who are already in not especially beneficial situations (Furstenberg 2007; Luker 1996). This finding is

important because it shows that research on high adolescent fertility rates needs to address issues of poverty rather focusing on changing individual behavior. Moreover, I think it is important to end the negative stigma of teen motherhood. The stigma tends to marginalize the women and perpetuates the cycle of poverty and social exclusion (Arai 2009; Luker 1996).

In short, the findings of my dissertation have shown that adolescent fertility is an issue of significant social concern, especially among Latinas, because this is the fastest growing population in the United States. The Obama administration is trying to address the problem of teen pregnancy by focusing on modifying individual behavior with more sexual education. However, the results of analyses undertaken in my dissertation show that teen fertility has deep roots in social inequality and poverty; therefore, my findings raise questions about the current approach that President Obama has undertaken to address teen fertility in the United States.

## REFERENCES

- Acock, A. 2005. "Working with Missing Values." *Journal of Marriage and Family* 67:1012-28.
- AddHealth. 2004. *Wave III Data Documentation*. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill.
- Allison, P.D. 2001. *Missing Data*. Thousand Oaks, CA: Sage Publications.
- Aneshensel, C.S., R.M. Becerra, E.P. Fielder, and R.H. Schuler. 1990. "Onset of Fertility-Related Events During Adolescence: A Prospective Comparison of Mexican American and Non-Hispanic White Females." *American Journal of Public Health* 80:959-96
- Arai, L. 2009. *Teenage Pregnancy : The Making And Unmaking of a Problem*. Portland, OR: Policy Press.
- Bean, F.D. & J. P. Marcum. 1978. "Differential Fertility and the Minority Group Status Hypothesis: An assessment and Review." Pp. 189–211, *The Demography of Racial and Ethnic Groups*, edited by F.D. Bean & W.P. Frisbie. New York: Academic Press.
- Bean, F.D. and G. Swicegood. 1985. *Mexican American Fertility Patterns*. Austin, TX: University of Texas Press.
- Bean, F.D. and M. Tienda. 1987. *The Hispanic Population of the United States*. New York: Russell Sage Foundation.

- Bickel, R. and M. McDonough. 1997. "Opportunity, Community, and Reckless Lives: Social Distress Among Adolescents in West Virginia." *Journal of Social Distress and the Homeless* 6:29-44.
- Biggs, M.A., L. Ralph, A.M. Minnis, A. Arons, K.S. Marchi, J.A. Lehrer, P.A. Braveman, and C.D. Brindis. 2010. "Factors Associated With Delayed Childbearing: From the Voices of Expectant Latina Adults and Teens in California." *Hispanic Journal of Behavioral Sciences* 32:77-103.
- Blossfeld, H.-P. and J. Huinink. 1991. "Human Capital Investments or Norms of Role Transition? How Women's Schooling and Career Affect the Process of Family Formation." *American Journal of Sociology* 97:143-68.
- Bongaarts, J. 1978. "A Framework for the Proximate Determinants of Fertility." *Population and Development Review* 4:105-32.
- Boonstra, H. 2010. "Key Questions for Consideration as a New Federal Teen Pregnancy Prevention Initiative Is Implemented." *Guttmacher Policy Review*. Available online at <http://www.guttmacher.org/pubs/gpr/13/1/gpr130210.html>.
- Brindis, C., A.L. Wolfe, V. McCarter, S. Ball, and S. Starbuck-Morales. 1995. "The Associations Between Immigrant Status and Risk-Behavior Patterns in Latino Adolescents." *The Journal Of Adolescent Health : Official Publication of the Society for Adolescent Medicine* 17:99-105.
- Brindis, C.D. 2006. "A Public Health Success: Understanding Policy Changes Related to Teen Sexual Activity and Pregnancy." *Annual Review of Public Health* 27:277-95.

U.S. Census Bureau. 2008. *Projections of the Population by Sex, Race, and Hispanic*

*Origin for the United States: 2010 to 2050*. 2008 National Population

Projections. Available at

<http://www.census.gov/population/www/projections/summarytables.html>

Caldwell, J.C. 1976. "Toward A Restatement of Demographic Transition Theory."

*Population and Development Review* 2: 321-66.

—. 1980. "Mass Education as a Determinant of the Timing of Fertility Decline."

*Population and Development Review* 6:225-255.

Casares, W.N., M. Lahiff, B. Eskenazi, and B.L. Halpern-Felsher. 2010. "Unpredicted

Trajectories: The Relationship Between Race/Ethnicity, Pregnancy During

Adolescence, and Young Women's Outcomes." *Journal of Adolescent Health*

47:143-50.

Caucutt, E., N. Guner, and J. Knowles. 2002. "Why Do Women Wait? Matching, Wage

Inequality and the Incentives for Fertility Delay." *Review of Economic*

*Dynamics* 54:815-55.

Center for Disease Control and Prevention. 2010. *About Teen Pregnancy*. Teen

Pregnancy. Available at <http://www.cdc.gov/TeenPregnancy/AboutTeenPreg.htm>

Chantala, K. 2006. *Guidelines for Analyzing Add Health Data*. Population Center,

University of North Carolina at Chapel Hill. Chapel Hill, NC: Carolina. Available

at <http://www.cpc.unc.edu/projects/addhealth/data/guides>.

Chantala, K. and J. Tabor. 1999. *Strategies to Perform a Design-Based Analysis Using*

*the Add Health*. Population Center, University of North Carolina at Chapel Hill.

- Chapel Hill, NC: Carolina. Available at <http://www.cpc.unc.edu/projects/addhealth/faqs/aboutdata/index.html#the-paper-strategies-to>.
- Cleland, J. and G. Rodriguez. 1988. "The Effect of Parental Education on Marital Fertility in Developing Countries." *Population Studies: A Journal of Demography* 42:419-42.
- Clogg, Clifford C., E. Petkova, and A. Haritou. 1995. "Statistical Methods for Comparing Regression Coefficients Between Models." *American Journal of Sociology* 100:1261-1293.
- Conde, E. 2009. "The Effects of Different Methods for Addressing Issues of Missing Data in Models of Teen Pregnancy." Master's Thesis. Texas A&M Health and Science Center. College Station, TX.
- . 2011. "Potential Problems with Multiple Imputation in Health Data." Paper Presented at the Annual in American Sociological Association Conference. Las Vegas, NV.
- Cornell University Law School. *Marriage Laws of the Fifty States, District of Columbia and Puerto Rico*. Legal Information: Marriage Laws. Cornell University Law School. Available at [http://topics.law.cornell.edu/wex/table\\_marriage#k](http://topics.law.cornell.edu/wex/table_marriage#k).
- Darabi, K.F., J. Dryfoos, and D. Schwartz. 1986. "Hispanic Adolescent Fertility." *Hispanic Journal of Behavioral Sciences* 8:157-71.
- Davis, K. and J. Blake. 1956. "Social Structure and Fertility: An Analytic Framework." *Economic Development and Cultural Change* 4:211-35.

- Dehlendorf, C. 2010. "Sociocultural Determinants of Teenage Childbearing among Latinas in California." *Maternal & Child Health Journal* 14:194-201.
- Dehlendorf, C., K. Marchi, P. Braveman, and E. Vittinghoff. 2010. "Sociocultural Determinants of Teenage Childbearing Among Latinas in California." *Maternal and Child Health Journal* 14:194-201.
- Denner, J., D. Kirby, K. Coyle, and C. Brindis. 2001. "The Protective Role of Social Capital and Cultural Norms in Latino Communities: A Study of Adolescent Births." *Hispanic Journal of Behavioral Sciences* 23:3-21.
- Dogan-Ates, A. and C.Y. Carrion-Basham. 2007. "Teenage Pregnancy among Latinas: Examining Risk and Protective Factors." *Hispanic Journal of Behavioral Sciences* 29:554-569.
- Dore, M.M. and A.O. Dumois. 1990. "Cultural Differences in the Meaning of Adolescent Pregnancy." *Blacks and Hispanics in New York* 71:93-101.
- Driscoll, A.K., M.A. Biggs, C.D. Brindis, and E. Yankah. 2001. "Adolescent Latino Reproductive Health: A Review of the Literature." *Hispanic Journal of Behavioral Sciences* 23:255-326.
- East, P.L. 1998. "Racial and Ethnic Differences in Girls' Sexual, Marital, and Birth Expectations." *Journal of Marriage and Family* 60:150-162.
- Edin, K. and M. Kefalas. 2005. *Promises I Can Keep : Why Poor Women Put Motherhood before Marriage*. Berkeley: University of California Press.

- Elder, G.H., Jr. 1978. "Approaches to Social Change and the Family." Pp. S1-S38 in *Turning Points, Historical and Sociological Essays on the Family*, edited by J. Demos and S.S. Boocock. Chicago: University of Chicago Press.
- Enders, C.K. 2006. "A Primer on the Use of Modern Missing-Data Methods in Psychosomatic Medicine Research." *Psychosomatic Medicine* 68:427-736.
- . 2010. *Applied Missing Data Analysis*. New York: Guilford Press.
- Fischer, N.A. and J.P. Marcum. 1984. "Ethnic Integration, Socioeconomic Status, and Fertility Among Mexican Americans." *Social Science Quarterly* 65:583-593.
- Forste, R. and M. Tienda. 1996. "What's Behind Racial and Ethnic Fertility Differentials?" *Population and Development Review* 22 Supp(1): 109-133
- Foster, H., J. Hagan, and J. Brooks-Gunn. 2008. "Growing Up Fast: Stress Exposure and Subjective 'Weathering' in Emerging Adulthood." *Journal of Health and Social Behavior* 49:162-177.
- Francis, S.A. 2010. "Using the Primary Socialization Theory to Predict Substance Use and Sexual Risk Behaviors Between Black and White Adolescents." *Substance Use & Misuse* 45:2113-29.
- Frank, R. and P. Heuveline. 2005. "A Cross-Over in Mexican and Mexican-American Fertility Rates: Evidence and Explanations for an Emerging Paradox." *Demographic Research* 12:77-104.
- Furstenberg, F.F. 1992. "Teenage Childbearing and Cultural Rationality: A Thesis in Search of Evidence." *Family Relations* 41:239-243.



- . 2007. *Destinies of the Disadvantaged : The Politics of Teenage Childbearing*. New York: Russell Sage Foundation.
- Gandara, P.C. and F. Contreras. 2009. *The Latino Education Crisis : The Consequences of Failed Social Policies*. Cambridge, MA: Harvard University Press.
- Geronimus, A.T. 1986. "The Effects of Race, Residence, and Prenatal Care on the Relationship of Maternal Age to Neonatal Mortality." *American Journal of Public Health* 76:1416-21.
- . 1987. "On Teenage Childbearing and Neonatal Mortality in the United States." *Population and Development Review* 13:245-279.
- . 1992. "Teenage Childbearing and Social Disadvantage: Unprotected Discourse." *Family Relations* 41:244-8.
- . 1997. "Teenage Childbearing and Personal Responsibility: An Alternative View." *Political Science Quarterly* 112:405-30.
- . 2000. "To Mitigate, Resist, or Undo: Addressing Structural Influences on the Health of Urban Populations." *American Journal of Public Health* 90:867-72.
- . 2001. "Understanding and Eliminating Racial Inequalities in Women's Health in the United States: The Role of the Weathering Conceptual Framework." *Journal of the American Medical Women's Association (1972)* 56:133-136.
- . 2003. "Damned If You Do: Culture, Identity, Privilege, and Teenage Childbearing in the United States." *Social Science and Medicine* 57:881-893.
- . 2004. "Teenage Childbearing as Cultural Prism." *British Medical Bulletin* 69:155-166.

- Geronimus, A.T. and S. Korenman. 1993. "The Socioeconomic Costs of Teenage Childbearing: Evidence and Interpretation." *Demography* 30:281-290.
- Geronimus, A.T., S. Korenman, and M.M. Hillemeier. 1994. "Does Young Maternal Age Adversely Affect Child Development? Evidence from Cousin Comparisons in the United States." *Population and Development Review* 20:585-609.
- Geronimus, A.T., S. Korenman, M.M. Hillemeier, and C. University of Michigan. Population Studies. 1992. *Does Young Maternal Age Adversely Affect Child Development?: Evidence from Cousin Comparisons*. Ann Arbor, MI: University of Michigan, Population Studies Center.
- Gilliam, M. 2007. "The Role of Parents and Partners in the Pregnancy Behaviors of Young Latinas." *Hispanic Journal of Behavioral Sciences* 29:50-67.
- Goldscheider and Ulenberg. 1969. "Minority Group Status and Fertility." *The American Journal of Sociology* 74:361-372.
- Grieco, E.M. 2007. *Race and Hispanic Origin of the Foreign-Born Population in the United States: 2007*. American Community Survey Available at <http://www.census.gov/prod/www/abs/pop-ac.html>.
- Guilamo-Ramos, V., J. Jaccard, J. Pena, and V. Goldberg. 2005. "Acculturation-Related Variables, Sexual Initiation, and Subsequent Sexual Behavior Among Puerto Rican, Mexican, and Cuban Youth." *Health psychology : Official Journal of the Division of Health Psychology, American Psychological Association* 24:88-95.
- Hamilton, B., J. Martin, J. S. Ventura. 2010. *Births Preliminary Data for 2009*. National Vital Statistics Report: U.S. Department of Health and Human Services.

- Hammel, E.A. 1990. "A Theory of Culture for Demography." *Population and Development Review* 16:455-485.
- Haney-Lopez, I. 2003. *Racism on Trial : The Chicano Fight for Justice*. Cambridge, Mass: Belknap Press of Harvard University Press.
- Harris, K.M. 1997. *Teen Mothers and the Revolving Welfare Door*. Philadelphia: Temple University Press.
- Harris, Kathleen Mullan. 2009. *The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994–1996; Wave III, 2001–2002; Wave IV, 2007–2009* [machine-readable data file and documentation]. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill.
- Harris, K.M., C.T. Halpern, E. Whitse, J. Hussey, J. Tabor, P. Entzel, and J.R. Udry. 2009. *The National Longitudinal Study of Adolescent Health: Research Design* [WWW document]. URL: <http://www.cpc.unc.edu/projects/addhealth/design>.
- Hirschman, C. 1994. "Why Fertility Changes." *Annual Review of Sociology* 20:203-33.
- Hodgkinson, S.C., E. Colantuoni, D. Roberts, L. Berg-Cross, and H.M.E. Belcher. 2010. "Depressive Symptoms and Birth Outcomes among Pregnant Teenagers." *Journal of Pediatric and Adolescent Gynecology*. 42:16-22.
- Hoffman, S. 2006. *By the Numbers—The Public Costs of Teen Childbearing*. Washington, DC: National Campaign to Prevent Teen Pregnancy.
- Hoffman, S.D. 1998. "Teenage Childbearing Is Not So Bad After All...Or Is It? A Review of the New Literature." *Family Planning Perspectives* 30:236-239+243.

- Horton, N.J. and S.R. Lipsitz. 2001. "Multiple Imputation in Practice: Comparison of Software Packages for Regression Models with Missing Variables." *American Statistician* 55:244-254.
- Hotz, J., S.W. McElroy, and S. Sanders. 2008. "Consequences of Teen Childbearing for Mothers Through 1993" in *Kids Having Kids*, edited by S.D. Hoffman and R.A. Maynard. Washington, D.C.: The Urban Institute Press.
- Hunt, L.M., S. Schneider, and B. Comer. 2004. "Should 'Acculturation' Be a Variable in Health Research? A Critical Review of Research on US Hispanics." *Social Science & Medicine* (1982) 59:973-986.
- Igwegbe, A.O. and G.O. Udigwe. 2001. "Teenage Pregnancy: Still an Obstetric Risk." *Journal of Obstetrics & Gynaecology* 21:478-481.
- INEGI. 2011a. *Natalidad: Porcentaje de Nacimientos Registrados de Madres Adolescentes (menores de 20 años), 1990 a 2009*. Mexico, City: Instituto Nacional de Estadísticas y Geografía. Available at <http://www.inegi.org.mx/sistemas/sisept/Default.aspx?t=mdemo28&s=est&c=17527>.
- INEGI. 2011b. *Mortalidad: Tasa de Mortalidad Infantil, 1990 a 2011*. Mexico, City: Instituto Nacional de Estadísticas y Geografía. Available at <http://www.inegi.org.mx/sistemas/sisept/Default.aspx?t=mdemo128&s=est&c=23601>.

- Jimenez, J., M. Potts, and D. Jimenez. 2002. "Reproductive Attitudes and Behavior Among Latina Adolescents." *Journal of Ethnic & Cultural Diversity in Social Work* 11:221-249.
- Kaplan, C., P. Erickson, and M. Juarez-Reyes. 2003. "Acculturation, Gender Role Orientation, and Reproductive Risk-Taking Behavior Among Latina Adolescent Family Planning Clients." *Sage Family Studies Abstracts: Trends in Marriage, Family, and Society* 25:103-121.
- Kenward, M.G. and J. Carpenter. 2007. "Multiple Imputation: Current Perspectives." *Statistical Methods in Medical Research* 16:199-218.
- King, R.B. and K.M. Harris. 2007. "Romantic Relationships among Immigrant Adolescents." *International Migration Review* 41:344-370.
- Klepinger, D.H., S. Lundberg, and R.D. Plotnick. 1995. "Adolescent Fertility and the Educational Attainment of Young Women." *Family Planning Perspectives* 27:23-28
- Krisberg, K. 2010. "Teen Pregnancy Prevention Focusing on Evidence." *Nation's Health* 40:1-14.
- Lee, J. and H.C. Hahm. 2010. "Acculturation and Sexual Risk Behaviors among Latina Adolescents Transitioning to Young Adulthood." *Journal of Youth and Adolescence* 39:414-427.
- Liebowitz, S.W., D.C. Castellano, and I. Cuellar. 1999. "Factors That Predict Sexual Behaviors among Young Mexican American Adolescents: An Exploratory Study." *Hispanic Journal of Behavioral Sciences* 21:470-479.

- London, B. and K. Hadden. 1989. "The Spread of Education and Fertility Decline: A Thai Province Level Test of Caldwell's 'Wealth Flows' Theory." *Rural Sociology* 54:17-36.
- Lopez, D.E. and G. Sabagh. 1978. "Untangling Structural and Normative Aspects of the Monority Status-Fertility Hypothesis." *American Journal of Sociology* 83:1491-97.
- Luker, K. 1996. *Dubious Conceptions : The Politics of Teenage Pregnancy*. Cambridge, MA: Harvard University Press.
- Mahavarkar, S.H., C.K. Madhu, and V.D. Mule. 2008. "A Comparative Study of Teenage Pregnancy." *Journal of Obstetrics and Gynaecology* 28:604-607.
- Marini, M.M. 1984. "Women's Educational Attainment and the Timing of Entry into Parenthood." *American Sociological Review* 49:491-511.
- Martin, J.A., B.E. Hamilton, P. Sutton, S.J. Ventura, T.J. Mathews, and M.J.K. Osterman. 2010. *Births: Final Data for 2008*. National Vital Statistics Report: U.S. Department of Health and Human Services.
- Mathews, T., S. Ventura, S. Curtin, and J. Martin. 1998. *Birth of Hispanic Origin, 1989-1995*. Monthly Vital Statistics Report. Available at [http://www.cdc.gov/nchs/data/mvstr/supp/mv46\\_06s.pdf](http://www.cdc.gov/nchs/data/mvstr/supp/mv46_06s.pdf).
- Mason, K.O. 1997. *Explaining Fertility Transitions*. Washington, DC: Population Association of America.

- Massey, D.S., J. Durand, and N.J. Malone. 2002. *Beyond Smoke and Mirrors: Mexican Immigration in an Era of Economic Integration*. New York: Russell Sage Foundation.
- McDonald, J.A., J. Manlove, and E.N. Ikramullah. 2009. "Immigration Measures and Reproductive Health Among Hispanic Youth: Findings from the National Longitudinal Survey of Youth, 1997-2003." *Health Journal of Adolescent Health* 44:14-24.
- McIntosh, W.A., L.T. Alston, and J.P. Alston. 1979. "The Differential Impact of Religious Preference and Church Attendance on Attitudes toward Abortion." *Review of Religious Research* 20:195-213.
- McKnight, P.E., K.M. McKnight, S. Sidani, and A.J. Figueredo. 2007. *Missing Data : A Gentle Introduction*. New York: Guilford Press.
- Menkes, C.and L. Suárez. 2003. "Sexualidad y Embarazo Adolescente en México." *Papeles de Poblacion* 35:233-63.
- Michelle, A.J. 2009. "Segmented Assimilation Theory and Perinatal Health Disparities Among Women of Mexican Descent." *Social Science & Medicine* 69:101-109.
- Mirowsky, J.and C.E. Ross. 2003a. *Education, Social Status, and Health*. New York: A. de Gruyter.
- Modell, J., F.F. Furstenberg, and D. Strong. 1978. "The Timing of Marriage in the Transition to Adulthood: Continuity and Change, 1860-1975." Pp. S120-S150 in *Turning Points, Historical and Sociological Essays on the Family*, edited by J. Demos and S.S. Boocock. Chicago: University of Chicago Press.

- Montejano, D. 2010. *Quixote's Soldiers A Local History of the Chicano Movement, 1966-1981*. Austin: University of Texas Press.
- Núñez-Urquiza, R.M., B. Hernández-Prado, C. García-Barrios, D. González, and D. Walker. 2003. "Embarazo No Deseado en Adolescentes, y Utilización de Métodos Anticonceptivos Posparto." *Salud Pública de Mexico* 45:92-102.
- Okunade, A.A. 2009. "Overweight Adolescents and On-time High School Graduation: Racial and Gender Disparities." *Atlantic Economic Journal* 37:225-242.
- Orozco, C. 2009. *No Mexicans, Women, or Dogs Allowed : The Rise of The Mexican American Civil Rights Movement*. Austin, TX.: University of Texas Press.
- Ortiz, C.G.and E. Vazquez Nuttall. 1987. "Adolescent Pregnancy: Effects of Family Support, Education, and Religion on the Decision to Carry or Terminate Among Puerto Rican Teenagers." *Adolescence* 22:897-917.
- Parnell, A.M., G. Swicegood, and G. Stevens. 1994. "Nonmarital Pregnancies and Marriage in the United States." *Social Forces* 73(1):263-287.
- Paternoster, R., R. Brame, P. Mazerolle, and A. Piquero. 1998. "Using the Correct Statistical Test for the Equality of Regression Coefficients." *Criminology* 36:859-866.
- Paul, B.and E.D. Aragon-Logan 2011. *National Longitudinal Study of Adolescent Health: Wave IV*. RTI International. Available at <http://www.cpc.unc.edu/projects/addhealth/data/guides/W3nonres.pdf>.



- Paul, C., W.M. Mason, D. McCaffrey, and S.A. Fox. 2008. "A Cautionary Case Study of Approaches to the Treatment of Missing Data." *Statistical Methods and Applications* 17:351-372.
- Perez, W. 2009. *We Are Americans : Undocumented Students Pursuing the American Dream*. Sterling, VA: Stylus.
- Perper, K., K. Peterson, J. Manlove, and B. Child Trends Data. 2010. *Diploma Attainment Among Teen Mothers*. Child Trends. Washington, DC. Available at [http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?\\_nfpb=true&\\_ERICExtSearch\\_SearchValue\\_0=ED510659&ERICExtSearch\\_SearchType\\_0=no&accno=ED510659http://www.childtrends.org/Files/Child\\_Trends-2010\\_01\\_22\\_FS\\_DiplomaAttainment.pdf](http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=ED510659&ERICExtSearch_SearchType_0=no&accno=ED510659http://www.childtrends.org/Files/Child_Trends-2010_01_22_FS_DiplomaAttainment.pdf).
- Perreira, K., K. Harris, and D. Lee. 2007. "Immigrant Youth in the Labor Market." *Work and Occupations* 34:5-34.
- Phipps, M.G., J.R. Salak, A.P. Nunes, and C. Rosengard. 2011. "Career Aspirations and Pregnancy Intentions in Pregnant Teens." *Journal of Pediatric and Adolescent Gynecology* 24:e11-e15.
- Portes, A. and R.G. Rumbaut. 2001. *Legacies : The Story of the Immigrant Second Generation*. Berkeley; New York: University of California Press ; Russell Sage Foundation.
- Portes, A. and M. Zhou. 1993. "The New Second Generation: Segmented Assimilation and Its Variants." *The Annals of the American Academy of Political and Social Science* 530:74-96.

- Poston, D.L. and L.F. Bouvier. 2010. *Population and Society*. New York: Cambridge University Press.
- Poston, D.L., C-F. Chang and D. Hong. 2006. "Fertility Differences between the Majority and Minority Nationality Groups in China." *Population Research and Policy Review* 25:67-101.
- Rees, C. 2011. "One Bad Apple May Not Spoil the Whole Bunch: Best Friends and Adolescent Delinquency." *Journal of Quantitative Criminology* 27:197-223.
- Rindfuss, R.R., L. Bumpass, and C. St. John. 1980. "Education and Fertility: Implications for the Roles Women Occupy." *American Sociological Review* 45:431-447.
- Rindfuss, R.R., S.P. Morgan, and K. Offutt. 1996. "Education and the Changing Age Pattern of American Fertility: 1963-1989." *Demography*. 33:277-290.
- Romo, H. and T. Falbo. 1996. *Latino High School Graduation : Defying the Odds*. Austin: University of Texas Press.
- Rostosky, S.S., M.D. Regnerus, and M.L.C. Wright. 2003. "Coital Debut: The Role of Religiosity and Sex Attitudes in the Add Health Survey." *The Journal of Sex Research* 40:358-367.
- Rubin, D.B. 1976. "Inference and Missing Data." *Biometrika* 63:581-590.
- . 1987. *Multiple Imputation for Nonresponse in Surveys*. New York: Wiley.
- Ryan, S., K. Franzetta, and J. Manlove. 2005. "Hispanic Teen Pregnancy and Birth Rates: Looking Behind the Numbers." *Research Brief*. Available online at <http://www.childtrends.org/Files/HispanicRB.pdf>.

- Saenz, R. 1997. "Pathways to Downward Mobility: The Impact of Schools, Welfare, and Prisons on People of Color." Pp. 373-409 in *Handbook of the Study of Racial and Ethnic Relations*, edited by H. Vera and J. Feagin. New York: Springer.
- Schafer, J. L., 1999. "Multiple Imputation: A Primer." *Statistical Methods in Medical Research* 8:3-15.
- Schafer, J. L., & Graham, J. W. 2002. 'Missing Data: Our View of the State of the Art.' *Psychological Methods* 7:147-177.
- Sen, A. 1999. *Development as Freedom*. New York: Knopf.
- Singh, S., J.E. Darroch, and J.J. Frost. 2001. "Socioeconomic Disadvantage and Adolescent Women's Sexual and Reproductive Behavior: The Case of Five Developed Countries." *Family Planning Perspectives* 33:251-289.
- StataCorp. 2009. *Stata Multiple-Imputation Reference Manual: Release 11*. College Station, TX: StataCorp LP.
- Steensland, B., J.Z. Park, M.D. Regnerus, L.D. Robinson, W.B. Wilcox, and R.D. Woodberry. 2000. "The Measure of American Religion: Toward Improving the State-of-the-Art." *Social Forces*. 79:291-318.
- Sterling, S.P. and L.S. Sadler. 2009. "Contraceptive Use Among Adolescent Latinas Living in the United States: The Impact of Culture and Acculturation." *Journal of Pediatric Health Care* 23:19-28.
- Suarez-Orozco, C., M.M. Suarez-Orozco, and I. Todorova. 2008. *Learning a New Land: Immigrant Students in American society*. Cambridge, MA: Belknap Press of Harvard University Press.

- Testa, M., N.M. Astone, M. Krogh, and K.M. Neckerman. 1989. "Employment and Marriage among Inner-City Fathers." *The Annals of the American Academy of Political and Social Science* 501:79-91.
- Treiman, D.J. 2009. *Quantitative Data Analysis: Doing Social Research to Test Ideas*. San Francisco, CA: Jossey-Bass.
- Twala, B. 2009. "An Empirical Comparison of Techniques for Handling Incomplete Data Using Decision Trees." *Applied Artificial Intelligence* 23(5):373-405.
- United Nations. 2008. *World Fertility Patterns 2007*. Wall Chart. New York: United Nations. Available at <http://www.un.org/esa/population/publications/worldfertility2007/worldfertility2007.htm>.
- . 2010. *World Fertility Patterns 2009*. Wall Chart. New York: United Nations. Available at <http://www.un.org/esa/population/publications/worldfertility2009/worldfertility2009.htm>
- UNFPA. 2011. *The Maternal Health Thematic Fund: Annual Report 2010*. United Nations Population Fund. UNFPA. Available at <http://www.unfpa.org/public/home/news/pid/6423>.
- Unger, J., A. Ritt-Olson, K. Wagner, D. Soto, and L. Baezconde-Garbanati. 2007. "A Comparison of Acculturation Measures Among Hispanic/Latino Adolescents." *Journal of Youth and Adolescence* 36:555-65.

- Upchurch, D.M., L. Levy-Storms, C.A. Sucoff, and C.S. Aneshensel. 1998. "Gender and Ethnic Differences in the Timing of First Sexual Intercourse." *Family Planning Perspectives* 30:121-7.
- Upchurch, D.M., L.A. Lillard, and C.W.A. Panis. 2002. "Nonmarital Childbearing: Influences of Education, Marriage, and Fertility." *Demography* 39:311-29.
- Valenzuela, A. 1999. *Subtractive Schooling : U.S.-Mexican Youth and the Politics of Caring*. Albany: State University of New York Press.
- van Buuren, S. 2007. "Multiple Imputation of Discrete and Continuous Data by Fully Conditional Specification." *Statistical Methods in Medical Research* 16:219-242.
- Vaquera, E. 2006. "The Implications of Choosing 'No Race' on the Salience of Hispanic Identity: How Racial and Ethnic Backgrounds Intersect among Hispanic Adolescents." *Sociological Quarterly* 47:375-396.
- Vazquez Sandrin, G. 2010. "Fecundidad indígena." Mexico, D.F.: Miguel Angel Porrua.
- Ventura, S. and B. Hamilton. 2011. *U.S. Teenage Birth Rate Resumes Decline. NCHS data brief no.58*. National Center for Health Statistics. Available at <http://www.cdc.gov/nchs/data/databriefs/db58.htm>.
- Ventura, S., T. Mathews, and B. Hamilton. 2001. *Births to Teenagers in the United States, 1940–2000*. NVSR (49):10. National Center for Health Statistics. Available at <http://www.cdc.gov/nchs/pressroom/01facts/teenbirths.htm>
- Waddell, E.N., J. Sackoff, M.G. Orr, and J.S. Santelli. 2010. "Pregnancy Risk Among Black, White, and Hispanic Teen Girls in New York City Public Schools." *Urban Health Journal of Urban Health* 87:426-439.

- Wahl, A.M. 2010. "Gender, Acculturation and Alcohol Use Among Latina/O Adolescents: A Multi-Ethnic Comparison." *Journal of Immigrant & Minority Health* 12:153-165.
- White, I.R., A.M. Wood, and P. Royston. 2007. "Multiple Imputation in Practice." *Statistical Methods in Medical Research* 16:195-197.
- World Health Organization. 2006 "Pregnant Adolescents Delivering on Global Promises of Hope." Oxford, UK: World Health Organization. Available at [http://www.who.int/child\\_adolescent\\_health/documents/9241593784/en/](http://www.who.int/child_adolescent_health/documents/9241593784/en/)
- Wilson, W.J. 1996. *When Work Disappears : The World of the New Urban Poor*. New York: Knopf.
- Xie, Y. and E. Greenman. 2011. "The Social Context of Assimilation: Testing Implications of Segmented Assimilation Theory." *Social Science Research* 40:965-984.
- Yang, Z. and L.M. Gaydos. 2010. "Reasons for and Challenges of Recent Increases in Teen Birth Rates: A Study of Family Planning Service Policies and Demographic Changes at the State Level." *Journal of Adolescent Health* 46:517-524.
- Young, T., J. Turner, G. Denny, and M. Young. 2004. "Examining External and Internal Poverty as Antecedents of Teen Pregnancy." *American Journal of Health Behavior* 28:361-73.

## APPENDIX A

Figure 1. 2005-2010 Teen Fertility Rates: How Does the U.S. Compare to Other Countries?

---

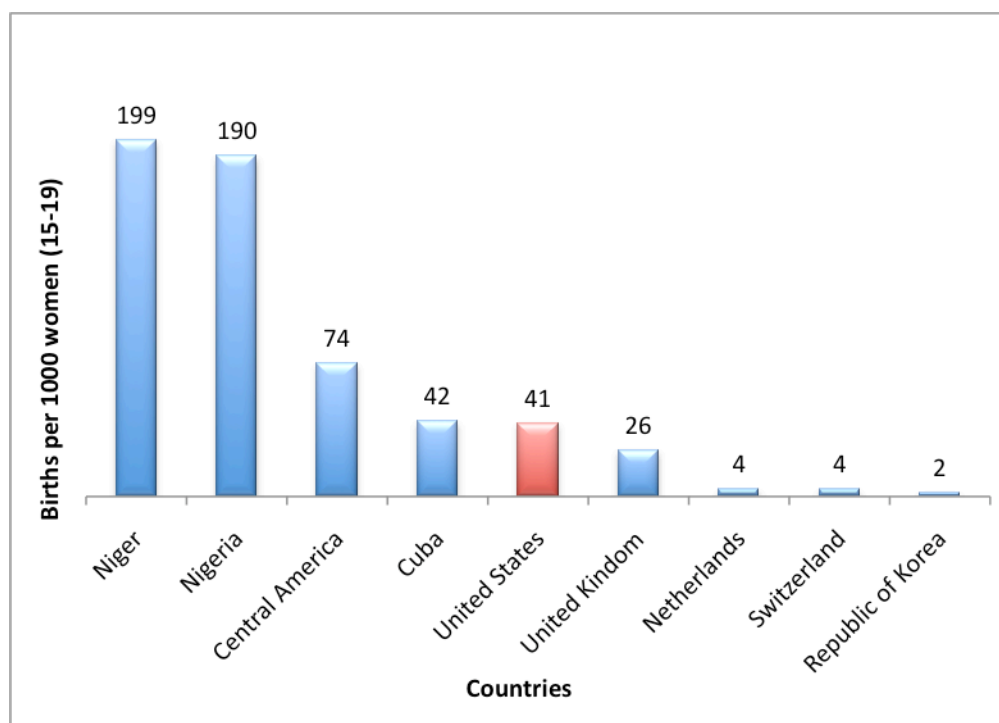


Figure 2. 2009 Teen Birth Rates by Race and Ethnicity in the United States

---

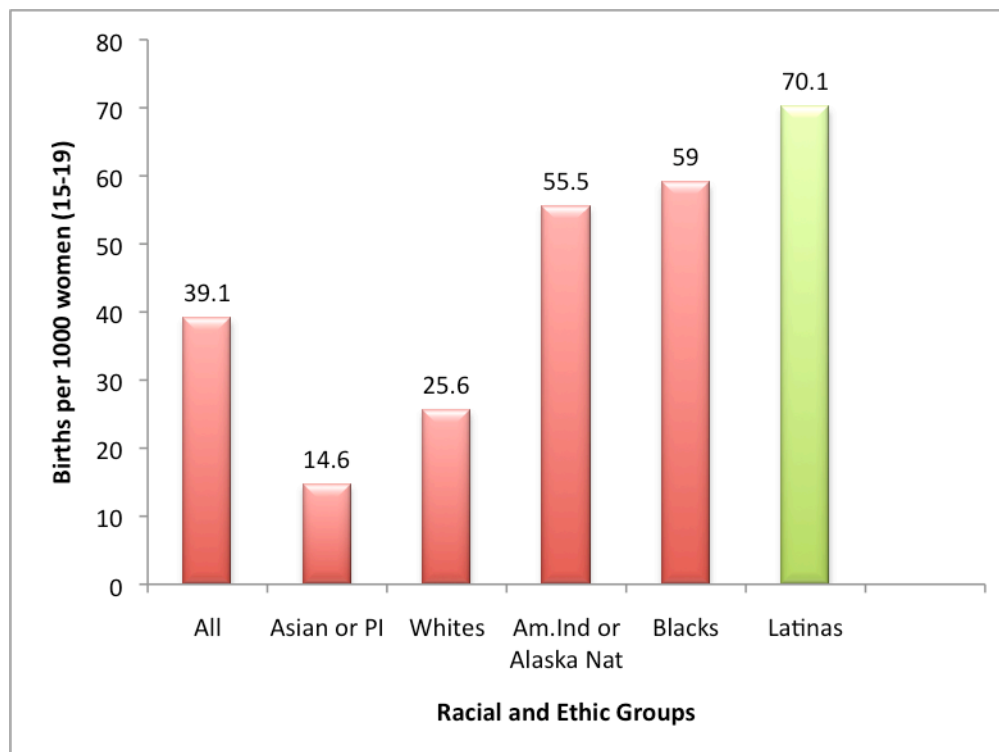




Figure 3. 2008 Teen Birth Rates for Latinas by Ethnic background

---

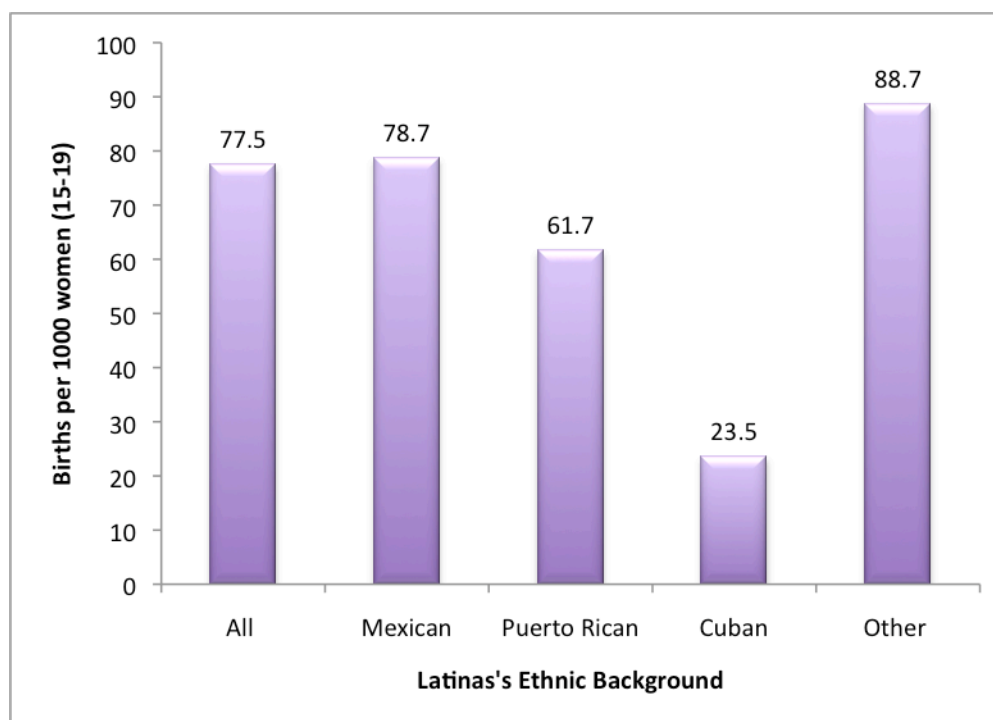


Figure 4. Teen Birth Rates in the United States (1940-2009)

---

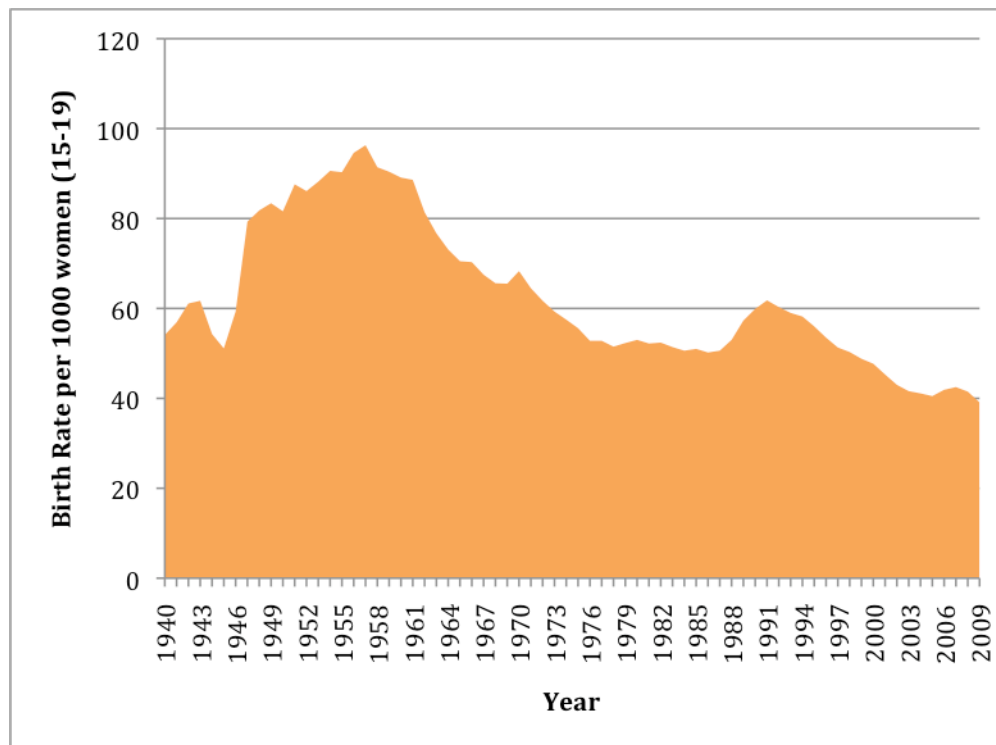


Figure 5. Teen Birth Rates by Race and Ethnicity in the United States (1993-2008)

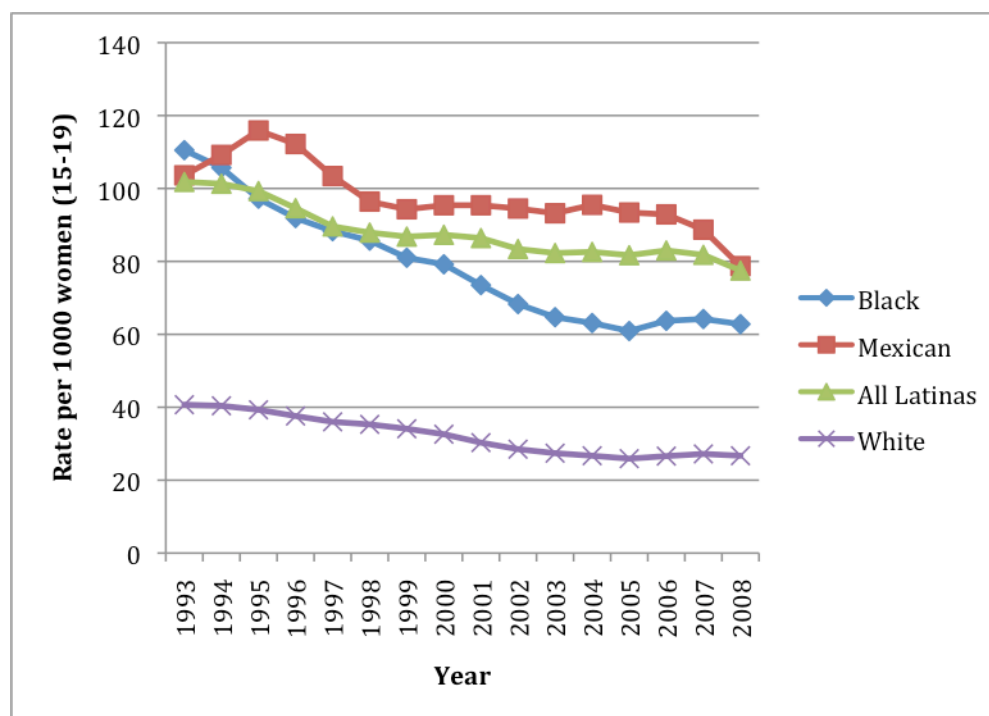
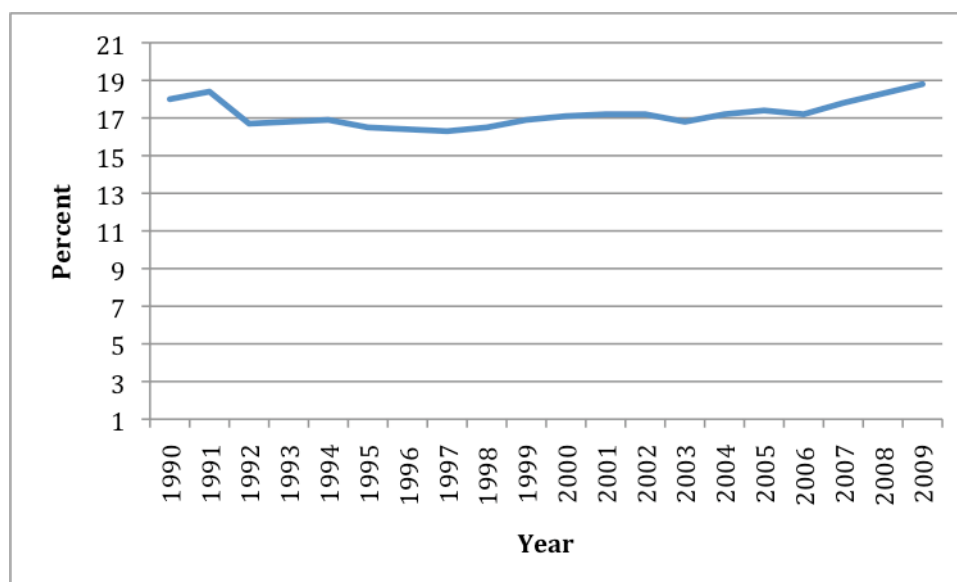


Figure 6. Percent of Teen Births to the Total Number of Births in Mexico (1990-2009)

---



## APPENDIX B

Table 1. Social Characteristics Hypothesis Descriptive Statistics

Variable	Total	African American	Mexican Origin	non-Hispanic White
Mexican Origin	6			
African American	16			
Non- Hispanic White	78			
Teen Mothers	14	24	25	12
Mean Age at wave I	15.74	15.96	15.69	15.70
Mean Religious Importance	3.09	3.39	3.24	3.01
Religion				
None	12	11	6	12
Protestant	25	14	10	29
Evangelical	27	52	13	23
Black				
Protestant	1	5	0	1
Other	10	13	7	10
Catholic	25	5	63	25
Mean Household Income	42480	28340	29480	46420
Mean Parent Education	13.5	13.2	11.14	13.77
Enough to pay bills	83	71	74	86
N	4974	1204	363	3407

Table 2. Survey Adjusted Logistic Regression of Teen Birth on Social Characteristics Variables (Odds Ratios)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model MI
Mexican Origin	2.51** (0.72)	2.51** (0.71)	2.62** (0.73)	3.27** (0.97)	2.27** (0.74)	2.06* (0.66)	2.05* (0.66)	2.09** (0.55)
African American	2.42** (0.37) ref	2.45** (0.38) ref	2.62** (0.42) ref	2.05** (0.35) ref	1.96** (0.32) ref	1.62** (0.25) ref	1.61** (0.25) ref	1.51** (0.21) ref
Age		0.96 (0.04)	0.95 (0.04)	0.95 (0.04)	0.94 <sup>†</sup> (0.03)	0.94 (0.03)	0.94 (0.03)	0.95 <sup>†</sup> (0.09)
Religious Importance			0.85* (0.06)	0.79* (0.08)	0.79** (0.07)	0.78** (0.07)	0.78** (0.07)	0.78** (0.05)
Religion				1.46 (0.35)	1.44 (0.35)	1.27 (0.29)	1.27 (0.29)	1.22 (0.25)
None				1.36 (0.26)	1.49* (0.30)	1.49* (0.30)	1.50* (0.30)	1.50* (0.27)
Protestant				2.67** (0.46)	2.61** (0.47)	2.35** (0.43)	2.36** (0.44)	2.48** (0.42)
Evangelical				3.11* (1.44)	3.04* (1.48)	2.62 <sup>†</sup> (1.30)	2.61 <sup>†</sup> (1.32)	2.66* (1.12)
Black				1.38 (0.29)	1.41 (0.30)	1.33 (0.29)	1.33 (0.29)	1.49* (0.26)
Protestant				ref	ref	ref	ref	ref
Other					0.86** (0.02)	0.91** (0.03)	0.91** (0.03)	0.90** (0.02)
Parent Education						0.98** (0.00)	0.98** (0.00)	0.99** (0.02)
Household Income							0.85 (0.12)	0.79 <sup>†</sup> (0.10)
Enough to pay bills								
N	4974	4974	4974	4974	4974	4974	4974	6895

<sup>†</sup> <.10; \*P<.05; \*\*P<.01

Table 3. Pregnancy Views Hypothesis Descriptive Statistics

	Total	Mexican Origin Mean	non-Hispanic White Mean
Mexican Origin	7		
White	93		
Pregnancy: Not So Bad	7	14	7
Mean Age at Wave I	16.83	16.86	16.83
Mean Religious Importance	2.93	3.29	2.90
Religion			
None	14	7	14
Protestant	24	10	25
Evangelical	22	10	23
Black Protestant	0	0	1
Other	11	7	11
Jewish			
Catholic	28	66	25
Mean Household Income	45900.00	25080.00	47560.00
Mean Parental Education	13.48	10.69	13.71
Enough to pay bills	84	68	85
N	2639.00	280.00	2359.00

Table 4. Survey Adjusted Logistic Regression of Pregnancy Views on Social Characteristics Variables (Odds Ratios)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model MI
Mexican Origin	2.22* (0.75)	2.23* (0.79)	2.36* (0.84)	2.62** (0.94)	1.89 (0.77)	1.69 (0.65)	1.68 (0.64)	1.36 (0.45)
White	ref	ref	ref	ref	ref	ref	ref	ref
Age		1.38** (0.12)	1.38** (0.12)	1.37** (0.12)	1.36** (0.12)	1.36** (0.12)	1.36** (0.12)	1.31** (0.08)
Religious Importance			0.88 (0.08)	0.87 (0.12)	0.87 (0.12)	0.85 (0.12)	0.86 (0.12)	0.86 (0.11)
Religion								
None				1.23 (0.49)	1.20 (0.50)	1.09 (0.45)	1.10 (0.46)	1.05 (0.26)
Protestant				1.15 (0.33)	1.18 (0.35)	1.19 (0.35)	1.19 (0.36)	1.09 (0.21)
Evangelical				1.50 (0.51)	1.39 (0.47)	1.28 (0.44)	1.28 (0.45)	1.31 (0.26)
Other				1.63 (0.58)	1.63 (0.57)	1.51 (0.52)	1.50 (0.52)	0.98 (0.24)
Catholic				ref	ref	ref	ref	ref
Parent Education					0.90* (0.04)	0.94 (0.05)	0.94 (0.05)	0.94 <sup>†</sup> (0.03)
Household Income						0.99** (0.00)	0.99* (0.00)	0.99* (0.00)
Enough to pay bills							0.90 (0.29)	0.90 (0.18)
N	2628.00	2628.00	2628.00	2628.00	2628.00	2628.00	2628.00	4919.00

<sup>†</sup><.10; \*P<.05; \*\*P<.01



Table 5. Educational Aspirations and Experiences Hypothesis Descriptive Statistics

Variable	Mean Total	Mean Mexican Origin	Mean non-Hispanic White
Teen Mothers	12.5	25	12
Mean Age at Wave I	15.7	15.69	15.71
Mean Religious Importance	3.03	3.24	3.00
Religion			
None	12	06	12
Protestant	27	10	28
Evangelical	22	13	23
Black	00		01
Protestant			
Other	10	07	10
Catholic	28	63	25
Mean Household Income	45530.00	29500.00	46834.00
Mean Parent Education	13.56	11.15	13.75
Enough to pay bills	85	75	85
Mean Likely to go to College	4.26	3.95	4.30
Repeated a school year	14	21	13
Did not Graduate from College	64	82	62
N	3797	364	3433

Table 6. Survey Adjusted Logistic Regression of Teen Birth on Educational Aspirations and Experiences, All Adolescent Females (Odds Ratios)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model MI
Likely to go to College	0.75** (0.05)	0.76** (0.35)	0.76** (0.05)	0.77** (0.05)	0.78** (0.05)	0.82** (0.06)	0.85* (0.06)	0.85* (0.06)	0.83** (0.05)
Repeated a school year	1.88** (0.35)	1.83** (0.35)	1.92** (0.38)	1.89** (0.37)	1.76** (0.35)	1.61* (0.31)	1.45 <sup>†</sup> (0.28)	1.45 <sup>†</sup> (0.29)	1.47* (0.25)
Mexican Origin		2.25** (0.68)	2.25** (0.65)	2.36** (0.67)	2.94** (0.91)	2.28** (0.74)	2.07* (0.67)	2.06* (0.67)	2.05** (0.54)
White		ref	ref	ref	ref	ref	ref	ref	ref
Age			0.94 (0.04)	0.93 <sup>†</sup> (0.04)	0.93 <sup>†</sup> (0.04)	0.92 <sup>†</sup> (0.04)	0.93 <sup>†</sup> (0.04)	0.93 <sup>†</sup> (0.08)	0.93* (0.03)
Religious Importance				0.86* (0.06)	0.82 <sup>†</sup> (0.09)	0.81* (0.08)	0.79* (0.08)	0.79* (0.08)	0.77** (0.06)
Religion									
None					1.47 (0.41)	1.46 (0.41)	1.30 (0.35)	1.32 (0.36)	1.18 (0.30)
Protestant					1.29 (0.27)	1.36 (0.30)	1.36 (0.30)	1.37 (0.30)	1.37 (0.28)
Evangelical					2.55** (0.52)	2.51** (0.52)	2.28** (0.49)	2.29** (0.50)	2.37** (0.46)
Black Protestant					2.42 (1.78)	2.14 (1.54)	1.79 (1.28)	1.84 (1.32)	1.55 (1.06)
Other					1.14 (0.28)	1.18 (0.29)	1.14 (0.29)	1.14 (0.29)	1.45 <sup>†</sup> (0.29)
Catholic Parent Education					ref	ref	ref	ref	ref
Household Income						0.89** (0.03)	0.93* (0.03)	0.93* (0.03)	0.92* (0.03)
Enough to pay bills							0.98** (0.00)	0.99** (0.00)	0.99** (0.00)
								0.83 (0.16)	0.74 <sup>†</sup> (0.12)
N	3797	3797	3797	3797	3797	3797	3797	3797	5084

<sup>†</sup> <.10; \*P<.05; \*\*P<.01

Table 7. Survey Adjusted Logistic Regression of Teen Birth on Educational Aspirations and Experiences, Adolescents Whose Pregnancy Occurred after Wave I (Odds Ratios)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model MI
Likely to go to College	0.83*	0.84*	0.83*	0.85*	0.86*	0.91	0.96	0.96	0.91
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.08)	(0.08)	(0.06)
Repeated a school year	1.71**	1.65**	1.96**	1.94**	1.79**	1.61*	1.42 <sup>†</sup>	1.42 <sup>†</sup>	1.41 <sup>†</sup>
	(0.34)	(0.33)	(0.41)	(0.41)	(0.39)	(0.35)	(0.30)	(0.30)	(0.26)
Mexican Origin		2.35**	2.34**	2.42**	2.82**	2.13**	1.91*	1.91*	2.02**
		(0.67)	(0.57)	(0.59)	(0.73)	(0.63)	(0.56)	(0.56)	(0.49)
White Age		ref	ref	ref	ref	ref	ref	ref	ref
			0.80**	0.79**	0.79**	0.78**	0.79**	0.79**	0.78**
			(.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Religious Importance				0.88 <sup>†</sup>	0.82 <sup>†</sup>	0.81 <sup>†</sup>	0.80*	0.80*	0.78**
				(0.06)	(0.10)	(0.09)	(0.09)	(0.09)	(0.07)
Religion None					1.26	1.25	1.10	1.10	1.14
					(0.10)	(0.43)	(0.37)	(0.37)	(0.33)
Protestant					1.01	1.07	1.07	1.07	1.13
					(0.23)	(0.25)	(0.25)	(0.25)	(0.26)
Evangelical					2.31**	2.29**	2.03**	2.03**	2.20**
					(0.49)	(0.49)	(0.44)	(0.44)	(0.46)
Black Protestant					2.78	2.45	2.05	2.06	1.93
					(2.11)	(1.81)	(1.48)	(1.50)	(1.32)
Other					1.17	1.22	1.18	1.18	1.69*
					(0.33)	(0.35)	(0.35)	(0.35)	(0.38)
Catholic Parent Education					ref	ref	ref	ref	ref
						0.88**	0.92*	0.92*	0.91**
						(0.03)	(0.04)	(0.04)	(0.03)
Household Income							0.98**	0.98**	0.98**
							(0.00)	(0.00)	(0.00)
Enough to pay bills								0.95	0.85
								(0.19)	(0.16)
N	3702	3702	3702	3702	3702	3702	3702	3702	4922

<sup>†</sup> <.10; \*P<.05; \*\*P<.01

Table 8. Survey Adjusted Logistic Regression of Teen Birth on Educational Aspirations and Experiences, Mexican Origin Teens (Odds Ratios)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model MI
Likelihood will go to College	0.85 (0.19)	0.86 (0.20)	0.85 (0.20)	0.75 (0.13)	0.73 <sup>†</sup> (0.13)	0.75 (0.15)	0.75 (0.15)	0.74 (0.15)	0.74 (0.14)	0.73* (0.10)
Held back in School	1.06 (0.52)	2.03 (0.96)	2.28 (1.21)	1.42 (.60)	1.45 (.60)	1.24 (.47)	1.24 (.47)	1.21 (.45)	1.20 (.46)	0.80 (0.27)
Age		0.55** (0.08)	0.53** (0.08)	0.71* (0.11)	0.72* (.11)	0.70* (.10)	0.71* (.10)	0.71* (.10)	0.70* (.10)	0.75** (0.07)
Religious Importance			1.33 (0.25)	1.30 (0.30)	1.36 (0.30)	1.37 (0.30)	1.37 (0.31)	1.36 (0.30)	1.37 (0.31)	1.07 (0.21)
Religion None				1.96 (2.2)	2.07 (2.24)	1.96 (2.11)	1.97 (2.16)	2.06 (2.29)	2.06 (2.28)	0.95 (0.83)
Protestant				1.09 (0.79)	1.04 (0.75)	1.14 (0.80)	1.14 (0.80)	1.19 (0.87)	1.13 (0.79)	1.00 (0.53)
Evangelical				1.91 (1.06)	1.85 (1.05)	1.75 (.99)	1.80 (.98)	1.87 (1.11)	1.91 (1.16)	1.76 (0.80)
Other				.88 (0.44)	0.86 (0.44)	1.10 (0.64)	1.12 (0.65)	1.16 (0.67)	1.15 (0.67)	1.91 <sup>†</sup> (0.74)
Catholic Parent Education				ref	ref	ref	ref	ref	ref	ref
Household Income					1.05 (0.05)	1.10 (0.07)	1.09 (0.07)	1.10 (0.07)	1.11 (0.07)	1.06 (0.06)
Enough to pay bills						0.98 <sup>†</sup> (0.01)	0.98 <sup>†</sup> (0.01)	0.98 <sup>†</sup> (0.01)	0.98 <sup>†</sup> (0.01)	0.99 (0.01)
Spanish at Home							1.17 (0.52)	1.22 (0.52)	1.35 (0.59)	1.04 (0.43)
US Born								1.17 (0.52)	1.08 (0.47)	1.31 (0.51)
N	364	364	364	364	364	364	364	364	364	582

<sup>†</sup><.10; \*P<.05; \*\*P<.01

Table 9. Survey Adjusted Logistic Regression of Not Graduating from College on Teen Births (Odds Ratios)

	Non-Hispanic White	Non-Hispanic White MI	Mexican Origin	Mexican Origin MI
Teen Mothers	6.56** (2.19)	5.07** (1.11)	12.11** (11.02)	5.50** (3.32)
Age	0.93 (0.05)	0.94 <sup>†</sup> (0.03)	1.41 (0.37)	0.91 (0.07)
Religious Importance	0.86 <sup>†</sup> (0.08)	0.84* (0.06)	0.90 (0.36)	0.94 (0.26)
Religion				
None	1.10 (0.35)	0.91 (0.21)	3.33 (4.70)	1.67 (1.67)
Protestant	1.25 (1.25)	0.98 (0.13)	0.78 (0.42)	0.95 (0.61)
Evangelical	2.50** (0.42)	1.80** (0.27)		3.85 <sup>†</sup> (3.04)
Black Protestant	1.87 (1.72)	1.80 (1.30)		
Other	1.63 (0.49)	1.17 (0.25)	0.75 (1.05)	1.03 (0.72)
Catholic	ref	ref	ref	ref
Household Income	0.98** (0.00)	0.98** (0.00)	0.99 (0.01)	0.99 (0.01)
Parent Education	0.84** (0.02)	0.82** (0.02)	1.01 (0.14)	0.92 (0.07)
Likelihood will go to College	0.37** (0.04)	0.39** (0.04)	0.25** (0.11)	0.45** (0.11)
Held back in School	3.64** (0.92)	3.68** (0.71)	5.70* (5.01)	3.79* (2.54)
N	2292	4467	254	616

<sup>†</sup><.10; \*P<.05; \*\*P<.01

## VITA

Name: Eugenia Conde-Dudding  
 Address: 1049 Canterbury Trail  
 Georgetown, TX 78626

Email Address: eucd\_75@yahoo.com

Education: B.A., *Cum Laude*, Psychology, Clark University 1997  
 M.Ed., Vocational Rehabilitation, The Univ. of Texas at Austin, 2003  
 M.S.P.H., Epidemiology, Texas A&M Health and Science Center, 2009

## PEER REVIEW PUBLICATIONS

Gorman, D.M., Conde, E. & Huber, J. 2007. "The Creation of Evidence in 'Evidence-Based' Drug Prevention: A Critique of the Strengthening Families Program Plus Life Skills Training Evaluation." *Drug and Alcohol Review*; 26: 585-93

Gorman, D.M. & Conde, E. 2007. "Conflict of Interest in the Evaluation and Dissemination of 'Model' School-Based Drug and Violence Prevention Programs." *Evaluation and Program Planning*; 30: 422-9.

Gorman, D.M. & Conde, E. 2008. "Further Comments on the Path to Drawing Reasonable Conclusions about Prevention." *Addiction*: 104: 152-153.

Conde, E. & Gorman, D.M. 2009. "Krieger's Conceptualization and Measurement of Discrimination and Internalized Oppression in Studies of Adverse Health Outcomes." *GeJournal*: 74:131-142.

Gorman, D.M. & Conde, E. 2010. "The Making of Evidence-Based Practice: The Case of Project ALERT." *Children and Youth Services Review*. 32:214-222

Poston, D. L. Jr., Conde, E & DeSalvo, D. Forthcoming. "China's Unbalanced Sex Ratio at Birth and the Increased Incidence of HIV." *Vulnerable Children and Youth Studies*.

## HONORS &amp; AWARDS

- The American Sociological Association Minority Fellow (MFP - Cohort 37).  
 Supported by Alpha Kappa Delta (AKD)